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# THE VARIOUS PRODUCTS
FROM THE
DUTCH EAST INDIES

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ESSAYS

ON

The Various Products Grown in and Exported from the Dutch East Indies

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N. C. WOLF

Managing Director of the Java Oversea Company
of Batavia

FOREWORD

To the Reader:

The following essays are written to give you an idea about the various articles grown in the Dutch East Indies. The information given in this book is far from complete, and for this reason you will find a blank page right through the book, to note down all further additions and statistics which might come in your possession.

The writer will be pleased to receive such additions.

This book is not on the market and only meant for the personal use of those presented with a copy.

Various information and figures are taken out of articles of Mr. L. de Bree in the Indische Financier; Gorkom's Oost Indische Cultures; out of Government statistics, and further from some works which are specially mentioned in some of the essays.

BATAVIA, 1-9-1919.

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SUGAR.

This produce is until now in the Dutch East Indies only cultivated in Java, though the Major-Chinese Tiong A. Fie of Medan is going to try sugar planting on Sumatra East Coast whilst in Celebes people are trying to get permission also for sugar-culture.

The reason why sugar is only planted in Java is not caused by the climate or fertility conditions, but by the favorable labor and transportation conditions. Java with its big population gives cheap labor, while for the other islands importation of labor is necessary, which of course increases immediately the cost of producing.

The improved machinery both for planting and manufacturing will, however, make the mills less dependent on native labor, and this will be one of the reasons that producing on the other D. E. I. islands will be possible at a competitive cost price. Another reason is the fact that the Government is not allowing more grounds in Java for sugar-planting, and this makes the sugar planter look around for ground suitable for sugar culture in the other islands.

The cheap labor and the thereby caused low cost price enabled Java to compete in the world market with other sugar producing countries, notwithstanding the relatively far distance, and in connection here-

with the high freight to Europe and America. As for all other articles, the sugar prices are immediately connected with the law of offer and demand and competition but I must mention that this competition was not always a fair one. Nearly all countries in Europe producing beet sugar were protecting their manufacturers with protective duties and export premiums, which ran to such a figure that competition was practically impossible and the price of sugar was put lower and lower. This caused the sugar price to be very uncertain and many Java crops had to be sold with a loss. The bad crop of ~~1884~~ lead to a crisis.

These were the reasons that early in 1900 nearly all Java sugar factories had big debts and practically no working capital, manufacturers were already satisfied when they could sell a crop without a loss. Some years were good, but immediately followed by bad years, with the result that the mill was put back for several years again.

The sugar agreement of Brussels of 1902, put in force in 1903 gave the wanted amendment. This agreement cancelled the export premiums for sugar and fixed the quantities allowed for export for some countries, as for instance, for Russia. Now competition came on an honest basis. Sugar prices came up and seldom a Java crop had to be sold at a loss since.

These remarks, are, of course, in general, as the conditions of existence for the various mills were dif-

ferent; for instance, new factories on new planted areas had a big percentage of sap, but a low sugar percentage. Other mills had to pay heavy rent or expensive labor and started too late to put in the latest improved machinery or transport means, etc., etc. All these are reasons that even now there are factories working at a loss, but these exceptions only confirm the general rule.

Since 1903 the sugar industry in Java developed enormously. The better prices enabled the factories to pay off their debts and to cultivate in a more extensive way, so that they became more and more independent of their cash advancers.

From 1894 till 1905 the amount of sugar mills decreased from 195 to 173; after 1905 an increase started, so that in 1913 there were again 190 factories. The planted areas increased from 105,702 bahoes in 1894 to 204,778 bahoes in 1913, respectively 75,011 H. A. and 145,321 H. A.

Out of these figures it is clear that the capacity of the sugar mills is doubled, but not only in quantity, as the planters have done their utmost to improve also the quality of cane and to find the best methods to extract all the sugar possible, and the figures prove that the production is increased three times.

The sugar planting in Java is now done on an absolutely scientific basis, and in order to be manager of a sugar mill a study of many years is necessary. A manager must be on the current of the planting of the cane, and also have such a knowledge of machin-

ery that when the work in the mill is interrupted he can give a decision or advice at once, and furthermore he must have a good knowledge of chemistry, which for sugar factories is an absolute necessity.

Scientific test stations assist the planters to examine the soil, and in his choice for fertilizers and planting material suitable for that soil. The latter is of the biggest importance, i. e., to select the kind of cane which gives on the particular soil of the mill the biggest quantity of sugar per bahoe.

What the result of this scientific manner has been, is proven out of the average production figures per bahoe, which increased from 81.15 per bahoe in 1894 to 115.9 piculs now.

Further, all efforts are made to increase the exploitation results and the percentage of residue is still decreasing; was in 1894 the so-called "zaksuiker" still an average of 8.7 picul per bahoe, now it is not more than 3.3 picul. Even the worked cane, called ampas, out of which all sugar which can be extracted is extracted is not thrown away, but used as fuel.

It is clear that the mills have to satisfy the wants of the trade, and the produce has to be according to the needs of the consumer.

One country wants a cheap sugar, another a fine grade, and the producer has to fulfill the wants of the trade. Formerly America was one of the biggest buyers of Java sugar, and wanted the No. 12-14, the so-called Muscovados, so practically all factories were producing this grade and but few were producing superior sugar.

Java can easily supply the moderate wants of Europe which mainly wants the channel assortment 16 or higher, but the continual increasing of the Cuba crops and the duties on sugar not produced in American colonies had made it practically impossible for Java planters to compete with Cuba and the export from Java to America is practically stopped. (Cuba had 20 per cent reduction, Porto Rico, Sandwich and Philippine Islands had free importation.) A new outlet had to be found for the quantity of sugar formerly exported to the U. S. A. and British India, China and Japan became the big customers instead of America, but these countries wanted less muscovados and more superior sugar.

This want could not be fulfilled without making big expenses, as the way of manufacturing had to be altered and big outlays had to be made for new machinery, but the manufacturers understood their own interests and gradually changed.

In 1913 the total Java output, about 24,000,000 piculs, was consumed in the Far East, with the exception of 100,000 piculs which were shipped to Vancouver. In the years 1914 to 1919 Europe was a big buyer again, as owing to the war the big beet producers could not supply the wants, and also the Cuba crop was not sufficient. Generally the expectation is that America will come open again for Java sugar in order to animate the export and import trade from the U. S. A. to the D. E. I.

The molasses were used to a certain extent in spirit

distilleries. The Ned. Ind. Landbouw My., one of the big sugar companies, started the Ned. Ind. Spiritus Mij. with two factories with a capacity of about 150,000 H. L. spirit.

The price of the Java sugar is influenced in normal times by the outturn of the crop; further, the amount of beet sugar crop in Europe and the cane sugar crop in Cuba.

The cost price of Java sugar varies according to different circumstances, an average cost price in 1903 was fl. 5.56, whilst in 1912 it was fl. 6.44.

What place has Java in the world sugar market? This question is studied and figured out by Willit Gray, New York, and F. O. Licht, of Magdeburg, who calculated the world crop for 1914 to be 18,500,000 tons, divided into about 8,910,000 beet sugar and 9,610,00 cane sugar; of the latter Java produces 1,345,000 tons or about 14 per cent, or over 7 per cent of the total world production.

The figures were given as follows:

BEET SUGAR.

		Tons
Europe—		
Germany	2,738,000	
Austria	1,710,000	
France	800,000	
Belgium	230,000	
Netherlands	230,000	
Russia	1,750,000	
Other countries	796,700	
America	655,300	8,910,000

CANE SUGAR.

		Tons
Europe—		
Spain	13,000	
America—		
Louisiana	261,000	
Texas	7,000	
Porto Rico	825,000	
Hawaii	535,000	
Cuba	2,500,000	
Barbados	30,000	
Br. Guiana	90,000	
Jamaica	15,000	
Trinidad	32,000	
Leeward Islands	18,000	
Windward Islands	6,000	
Martinique	42,000	
Guadeloupe	39,000	
St. Croix	7,500	
Haiti, Domingo	110,000	
Mexico	130,000	
Central America	22,000	
Suriname	13,000	
Venezuela	3,000	
Peru	145,000	
Argentine	225,000	
Brazil	200,000	4,755,500

		Tons
Asia—		
Br. India	2,262,600	
Java	1,345,230	
Formosa	190,000	
Philippines	195,000	3,992,830
Australia—		
Queensland	235,000	
New South Wales	20,000	
Fidji Islands	100,000	355,000
Africa—		
Egypt	58,000	
Mauritius	250,000	
Reunion	40,000	
Natal	85,660	
Mozambique	60,000	493,660
Total cane sugar, tons		9,610,000

The big war of course has changed a lot, and when the beet sugar output in Europe will be the same as before the war is hard to say.

The crisis in Java in 1917 was the cause of The Java Sugar Producers' Association, which sold first the 1918 sugar at increasing prices. The crop of 1919 was sold in March, 1919, for three-fourths of the expected output at upward prices. In January fl. 14.— was paid, in early April prices were fl. 20.— per picul for Superior White.

The association is in force until 1920 crop and will probably be continued, although several of the big producers want to be free again.

Sugar is packed in bags of 100 kilos. The quality is judged according to Dutch standard, which is fixed every year in Amsterdam, and samples of which are obtainable from the Nederlandsch Handel Mij., in Amsterdam, against payment of a certain amount.

The sugar is shipped from all ports from Java lying east from Cheribon, Cheribon included, and in the south coast also from Tjilatjap.

COCOANUT AND COPRAH-OIL.

The cocoanut palms are spread all over the tropical zone of the world, and since history is written down cocoanut palms are mentioned, so that it is impossible to state which country was the original cocoanut grower.

Practically all cocoanut planting is a native industry and the area planted by white men is very small compared with the native plantations.

The palm (cocos nucifera L.) is a very useful tree in the tropics. The white fluid contained in the nuts is used either as drink or as raw material for native strong alcoholic drinks, and also for kitchen use. The fruit shell is formed into various kinds of dishes, spoons, measures, etc.; the fibre is used for the fabrication of matting, and a coarse kind of rope; out of the flower bunch the natives extract cocoanut sugar, out of the flower leaves they make small baskets, spoons, etc.; of the palm leaves, brooms, seaves, etc.; the bark produces medicine and tanine; the whole tree is used for bridge and for building purposes. Practically everything can be used.

But the best part of the tree is the white substance in the fruit, which contains a very high percentage

(60 per cent) of vegetable oil, which oil is used in kitchen and lamps and soap manufacturing, and last but not least, as raw material for the margarine factories.

The cultivation of cocoanuts is very simple and easy. The tree starts to produce after 7-8 years, and gets a maximum production figure after ten years, after which time the produce remains good and with some care trees can produce from 80 to 100 years.

The European capitalists started in 1909-10 to get interested in cocoanut planting as a paying proposition. Various big concessions were obtained and in order to recover some of the expenses of the first seven years robusta coffee was planted as a catch-crop.

The palm grows practically everywhere up to 1000 feet above sea level. From the seventh to the tenth year a tree carries yearly 60-50 nuts, which sometimes can come up to 150 pieces, but as an average a production of 50 nuts per tree is considered satisfactory. To get good sound coprah only the ripe nuts have to be plucked, but the high prices of coprah induce the natives to pluck also the less ripe fruits and in Java 30 per cent unripe fruit is regularly found amongst coprah. Per-bahoe palms 5000-5500 nuts are produced per year, equal to 22½-25 piculs coprah (220 nuts give one picul coprah). Planted higher than 300 feet the palm produces gradually less and above 1000 feet seldom produce is obtained.

The coprah is made in the following manner:

Kiln Dried Coprah: The nuts are opened and the fluid thrown away and put above a small fire for about twelve hours; after this time the coprah is loose from the shell; it is then taken out and dried above fire for another twelve hours and then delivered to the buyer.

The quality is not up to standard, but this way of preparation is the easiest and quickest, consequently the most attractive for the natives, as they have to wait too long, according to their opinion, to make

Sun Dried Coprah: The nuts are put in the sun and after one or two days the coprah can be taken out, but has still to be put in the sun for another week before it is sufficiently dry to be sold.

The coprah contains then still 10-15 per cent water.

Special care has to be taken against rain, as rain damages the product very heavily and gives it a brown wormeaten appearance.

The Dutch East India coprah has a bad name on the European coprah market, and this is mainly due to the fact that no proper attention is given that the coprah is sound and properly dry before exported.

Good coprah must crack and be of a glazy appearance at the breaking and the shrinkage must not be over 4-5 per cent.

The big Chinese dealers in Java have made special arrangements with the native producers and are prepared to sell f. o. b. delivered weight at destination. This, of course, has made it very easy for the exporter,

who pays 95 per cent of the f. o. b. value against mates' receipts, balance to be settled after arrival at point of destination. Of course special attention has to be given to deal only with responsible parties.

Since 1900 several mills have been built in the various centers of coprah production with the purpose of crushing oil, i. e.

Insulinde oil mills in Padang, Macassar, Bantam, Batavia and Kediri.

Toradja in Macassar, **Rouwenhorst oil mills** in Tjilatjap.

Jurgens in Padang, United oil mills in East Java.

Hemmes in Pontianak.

Wilhelmina in Pontianak.

Oversea oil mills in Soerabaia.

The big question is now, will the steamship companies give special freight rates for coprah. The advantage of coprah is that practically speaking it can be stowed with any other cargo, whilst oil needs special care. Loading and discharging of coprah are very quick, but very slow with oil.

The Insulinde oil mills have therefore bought three tank steamers which will carry their oil to the various markets, and big tank installations have been made in Batavia and Soerabaia.

COCOANUT OIL.

This is, as mentioned before, produced in the various centers of coprah growing.

The article is sold on color and purity, i. e., the percentage of free fatty acids. Special care has to be taken when mentioning acids, if oleo-acids or laurine acids are meant, as about 4 per cent oleo equals 5 per cent laurine and many a dispute has been for arbitration in which seller delivered on base of laurine-acids, whilst buyer claimed oil of 3 per cent oleo-acids.

The grades are as follows:

1.—White cocoanut oil below 1 per cent ffa. oleine.
2.—White cocoanut oil below 3 per cent ffa. oleine.
3.—Yellow cocoanut oil below 3 per cent ffa. oleine.
4.—Yellow cocoanut oil below 4 per cent ffa. oleine.
5.—Yellow cocoanut oil below 3 per cent ffa. laurine.
6.—Yellow cocoanut oil telquel.

The latter three grades are mainly used for soap manufacturing.

Packing. The big question in Java has been what packing to use. Experience of writer has taught him that in case the oil is shipped within a month after production the packing of one case of two tins of 25

katti each gives a leakage figure below 1 per cent, for each month later add 1 per cent leakage.

The last five years a start has been made with packing into new barrels. The barrel material is imported from U. S. A., California, and the barrels put together in Java. In the beginning big leakages were caused because the workmen had not sufficient experience of putting barrels together, but gradually this improved, though it is not advisable to put the oil in barrels in case these barrels have to be stored for any period over three months.

The best way will be to have the oil shipped to Europe or America in the deep tanks of the steamers. The dockyard in Soerabaia cleans the tank and makes same suitable for the purpose for a couple of thousand guilders, but then at port of destination there has to be made proper installation to receive the oil.

The deep tanks have to be fitted with steam pipes in order to keep the oil fluid when arriving in colder climates, in order to be able to pump the oil out of the steamer into the tanks ashore.

COFFEE.

The general opinion is that coffee originates from Abyssinia, and from there it is spread all over the world, but first to Arabia (the Latin name of the first known coffee is still: Coffea Arabica).

General Governor Hendrik Zwardecroon was the one who imported in 1699 some coffee plants from Malabar. The Oostindische Compagnie realized the big importance of this produce and managed to obtain a kind of forced cultivation (i. e., the natives were bound to plant and grow coffee for the government), which lasted till about 1907.

The importance of this government coffee planting is proven out of a couple of production figures:

1829 the produce amounted to 281,661 picul.

1885 the produce amounted to 1,011,787 picul.

Then suddenly a disease was found in the plantations which affected mainly the leaves.

The disease was first found in 1869 in Ceylon, where all coffee plantations were ruined, and in 1870 Java became infected.

The planters, immediately this was known, looked around for means to overcome this serious attack, but the coffee Arabica was not strong enough and so

planters tried coffea Liberica, which is a stronger plant and was imported since 1875, but also this variety was affected by the leaf disease.

The production of the Java coffee (coffea Arabica) and the Liberia coffee has diminished very much and is now limited to the mountain districts, where the coffee plants seem not to suffer so much.

The bean of the Liberia coffee is bigger and more yellow than the Java coffee bean, which is more greenish blue.

Owing to the small production, both grades are to be considered as fancy coffees.

In 1900 a trial was made with coffea Robusta, a plant originated from the Congo.

Robusta proved to be a quick production and a good one, and the rubber planters used the Robusta coffee as a catch-crop, though later also big Robusta coffee plantations have been started.

The Robusta bean has (for the No. 1 qualities) very much resemblance with the Java coffee bean, but the color is lighter.

Various crossings have been tried (Excelsa, Hybriden, etc.), but none of them amounted to much until now. Robusta coffee produces the second year 5-6 piculs per bahoe; the fourth year 12-15 piculs.

The coffee is sold as G. B. (gewone bereiding—ordinary preparation), and W. I. B. (West India preparation).

G. B.—The coffee fruit is put in big flat containers and dried in the sun, which process takes a couple of

days. When the fruit is properly dried, it is stamped in rice blocks, or otherwise, holes made in the ground and lined with cowhide, which stamping has to be done very carefully to avoid a lot of broken beans.

After this process the coffee is assorted by means of tetampas (bamboo mats) and the coffee in shell is ready for delivery to be peeled.

W. I. B.—The fruits are received in containers (pulpers) and cleaned as much as possible and water freely used. In this machine the coffee is collected in a big container (with holes in the bottom to let the water leak out), and fermented for two to three days. After this process the rest of the fruit can be properly cleaned, also under addition of water, and afterward dried by a machine.

After being thoroughly dried the beans are peeled in a huller and assorted by a mechanical sieve, in—

Round beans, marked O. (Rondboon.)
Big beans, marked G. (Grofboon.)
Middle beans, marked M. (Middelboon.)
Small beans, marked K. (Kleinboon.)

And what cannot go through is called extra big, E. G. (Extra grofboon.)

After this mechanical assorting a hand picking by native women is done to pick out the black and inferior beans and the first grade coffee so obtained is put in bags of one picul each.

The difference between G. B. and W. I. B. can immediately be seen by appearance of the bean.

W. I. B. gives an even colored product; G. B. is more or less mottled.

The Kroe, Bali, Timor, Boenji and other varieties are produced on the islands around Java, and their output is comparatively so small (average of each grade about 20,000 piculs yearly, that all these coffees have to be considered fancy coffee. It is very hard to explain the differences between the various grades, and it takes years of practice before a coffee dealer can tell the difference right away between the various grades.

Robusta coffee is generally sold F. A. Q. (fair average quality), guaranteed not to contain over ½ per cent black and broken beans, and none of the so-called "stinkers."

It is very difficult to obtain exact produce figures, and the only reliable figures I could find were published by the Handelsvereeniging, Batavia, but these figures must be very incomplete. They gave for 1913 468,697 piculs, of which

251,295 piculs were exported to Holland.
64,342 piculs were exported to Havres.
18,212 piculs were exported to Marseilles.
46,605 piculs were exported to America.
15,951 piculs were exported to Denmark.
18,262 piculs were exported to Singapore (probably transshipped for France).
17,819 piculs were exported to Port Said.
6,355 piculs were exported to Hamburg.

The exact figures for China and Japan are unknown, as the Java-China-Japan line refuses to give any information to this effect.

The present production is about 700,000 piculs, which is only about 4 per cent of the world's production, for which Lanenville gives about 18,000,000 piculs.

The world figures for 1913-14 were:

Santos	10,800,000
Rio-Victoria Bahia	5,000,000
Other countries	4,500,000
	18,300,000

The main coffee markets are:

Six in America—New York, Boston, Philadelphia, Baltimore, Mobile, New Orleans.

Ten in Europe—Amsterdam, Havre, Hamburg, Bremen, Copenhagen, London, Antwerp, Triest, Marseilles, Bordeau.

TEA.

It took rather a long time before the planters took to tea planting in the Dutch East Indies. The main reason being that the D. E. I. teas could not compete with the China teas. The Dutch plantations in the nineteenth century originated from imported seeds from China, and the yield was comparatively very small; also the preparation of the leaves was done in a very primitive way.

The Dutch Government did everything in its power to make the tea planting result, but had to give this up, and since 1865 no Government teas were bought at the market and the planting was left in future to private enterprise.

The rise of Dutch tea planting started from the time the planters imported tea seeds from British India, where in Assam a wild growing tea plant was found which gave a bigger production than the Chinese plants. The seeds planted in Java gave from the very start splendid results, but the whole preparation of the product had to be altered before the planting could become a paying proposition.

The tea produced by the original Chinese seeds is called Java tea, the produce from the B. I. seeds is called Java-Assam tea (Sumatra-Assam tea).

The first Assam tea estates were planted in about 1873, but it took until about 1900 before tea planting was done on a bigger scale, and now gradually the few Java tea estates are also changing into Java-Assam tea estates.

Tea grows in Java on practically all kinds of soil, but not below 300 feet above sea level, and from there to 7000. The best quality of tea is produced near the tops of the volcanos, of which we have so many in Java on so-called new-volcanic grounds. The quantity produced is not so big, but the quality makes up for that.

The best tea plantations in Java are found on the plain of Pengalengan, about 5000 feet above sea level.

As the available suitable grounds for tea planting in Java have been practically taken up now, the tea planters had to look around for other suitable places and found those in Sumatra, where in Siantar big plantations have been opened during the last fifteen years and are very promising.

The tea plantations are comparatively small—from 300-1000 bahoes.

The tea shrub gives a produce after three or four years worth erecting a factory.

Only the four or five top leaves of each branch are gathered and brought to the factory. A tea factory is very simple and does not need very technical supervision, but only well trained workmen.

Tea is judged from taste, smell, color, appearance, and the buyers, in order to compare the qualities, take

a certain quantity of tea, which is for a certain length of time put in contact with a known quantity of boiling water and the various draughts obtained that way are tasted by a tea taster.

After the tea is prepared in the factory the produce is assorted by means of revolving sieves and the widths of the openings assort the teas respectively in dusts, broken pecco, pecco, pecco-souchon. The very young leaves of the tea tree are gathered separately and are covered with a kind of fine hair, which becomes yellow after preparation, and this produces the orange peccos.

Tea is packed in patent chests of 40 or 50 kg. which are lined with thin lead.

The Java production is estimated at about 60,000,000 half kilos.

The various big London tea firms opened branches in Batavia for the purchase of teas and so Batavia has become an important tea market. The following firms have a more or less buying interest in the tea trade: Rowley Davis Co. (1903), Harrison Crosfield, Ltd., (1910); Francis Peek Co. (1910), Westphal, King & Ramsay (1911); Phipps & Co., whilst in 1914 the Russians The Trading Co., successor to Alexia Goobkin A. Koosmetzoff & Co. opened an office.

The export figures before the war were:

38 per cent was exported to Holland.

34 per cent was exported to U. K.

10 per cent was exported to Russia.

8.4 per cent was exported to Australia.

One of the bad policies of the tea estates is that the native population also has started to grow tea, and this tea is bought by the estate.

The natives do not give proper care to their plantings, and so various diseases have come from the native plantations into the regular estates. Moreover, the natives are not very particular when harvesting, and a very inferior produce is obtained. And, according to the writer's opinion, it is a pity that the European planters follow the bad policy of buying these native teas to mix with their own produce.

TAPIOCA.

The tapioca roots originated from the tropical plants of America and from there they spread all over India. It is not known exactly when for the first time tapioca was introduced into the Dutch East Indies, but it is known that since the nineteenth century tapioca has become a part of the native meals. The Dutch Government has given herself much trouble to induce the natives to plant tapioca, especially in those parts of the islands where the rice crop was many a time unsatisfactory. In order to induce the natives to plant tapioca the Government arranged that tapioca be planted in these parts at such a time that the tapioca roots could be harvested at the time the rice from the rice crop was about consumed, and so the natives were induced to try this produce at the right moment.

The cassava is a so-called second plant, which means that it is planted on those grounds on which the main food is cultivated first. The tapioca does not need much care and planting is possible until 3000 feet above sea level. The soil may not be too wet and marsh grounds are unsuitable. The tapioca takes very much out of the grounds and sometimes the natives plant year after year tapioca roots on the same ground, which makes the crop become less and

less unless good fertilizers are used. The planting is very simple. The grounds are plowed in native fashion about one foot deep and some drainage is arranged. The planting is done by using sticks of tapioca of one-half foot length, of which half is put under the ground, at 4x3 feet distance, as practice has taught that planting from three to four feet apart gives the best results. In tapioca planting only the roots have value and so it is of importance that the roots are of the biggest possible size. The harvesting is done eight or nine months after the planting. The harvesting is done the same way as with potatoes, and on an average each plant gives from one to two kilograms of roots. The natives sell the produce when it is still standing on the field at from three to four cents per tree, which works out to from forty to sixty cents per picol roots, but when the planting is done in the European way, which means practically planting under the usual supervision, the produce is estimated to be about 250 picols roots per bahoe. The Handelsvereeniging Amsterdam has taken up this planting on an extensive scale, while also the Chinamen, particularly in Bandoeng, are acting as manufacturers of tapioca. In 1915 400,000 bouws were planted in tapiocas. The exports of the tapioca produce are as follows:

TAPIOCA ROOTS.

Tapioca roots are exported either in complete roots or cut into pieces. The roots are dried in the sun. Of course this is the most simple way for a native to

prepare the produce. Sometimes they make in a very primitive way sago flour, but the native flour is not suitable for export and as a rule it is reworked in the mills to a better quality.

TAPIOCA FLOUR AND FLAKE.

In the mills, by either Chinese or Europeans, the roots are ground by special means under addition of water, which water must be of specially pure quality in order to avoid that the mixture afterwards turns to yeast. This mixture is continually stirred and put through fine sieves into a centrifuge. What stays behind in the sieves is called "ampas" and is sold either in pieces or ground. The flour coming out of the centrifuge is again mixed with clear water and then filtered through cotton folders of cloth into big reservoirs of cement, and there it stays for twenty-four hours. Then the water is taken off and the flour taken out of the reservoir. The top part is the first quality, the lower, which is closer to the cement, is a little less and is called second quality. The whiter the flour and the dryer, the better. Six picols of roots give one picol of first quality flour and .05 picols second quality. The first quality flour is used also to make flake, etc. Flake is produced in the following way: The flour is brought in copper pans of two feet diameter with from 10 to 15 pounds contents. These pans have a double bottom in which steam of about 10 pounds pressure can be let in. After a couple of minutes the flour settles in the pan and is removed in

order to avoid burning. When it is taken out of the pans it is assorted into what we know as "flake" and "siftings." The flakes are the big pieces while the siftings are the small pieces and the flour that is left. Five kilograms of flour give three kilograms of flake. The so-called **"tapioca pearl,"** is made by grinding the flake and siftings several times and spread over a double copper plate in which small round holes cause the pearl form. From this it will be clear that the price of the various tapioca products depends upon the amount of work spent to manufacture the market produce. The tapioca roots are used as cattle food and further in Europe by many and many a starch factory. In America a special use is made of it in the cotton industry for starching cotton tissues. The better kind is used in biscuit factories and for various provision lines.

The average produce of tapioca flour is 50,000 tons, of which the biggest consumers are the United States of 40 per cent, Great Britain of 30 per cent, while France, Holland and China are also big consumers. The tapioca roots are exported in average quantities of 30,000 tons, and the biggest consumer for this line is Holland. Holland and Great Britain together take 90 per cent of the tapioca root produce.

Of tapioca pearl the average export is 1500 tons, 90 per cent of which goes to Great Britain and the United States of America, which consume equally big quantities.

The average tapioca flake export is 10,000 tons, of

which Great Britain and the United States take 80 per cent, equally half; France 10 per cent, Holland 5 per cent.

The Dutch tapioca found in the beginning a very difficult market, as the tapioca from Macassar and Malacca is very inferior to the Java qualities, and these inferior qualities were the biggest competitors. The general opinion of the producers is that the future of the tapioca trade is not in the export, but in the Indian industries, and the Government is giving attention to getting the industries here to use tapioca as raw material for the same object as such is used in Europe and America. In case the Dutch East Indies cannot find other markets, I do not believe that the tapioca trade as such will have a big future.

Tapiocas are packed as a rule in bags of 100 kilos. The quality is always compared with standard samples. The shipping ports are Batavia, Semarang and Soerabaya.

RUBBER.

As many a time mistakes are made between gutta percha and caoutchouc, it is necessary to point out the difference between these two articles. Caoutchouc rubber is very elastic, gutta percha is not. That is the reason why caoutchouc has far more use than gutta percha, and also will be in the future, moreover, now that the wireless will do away with submarine cables in the near future. Gutta percha is mainly used for the submarine cables and for some medical instruments. Gutta percha gets weak in boiling water and the form given then to it will stay after coating over. Gutta percha is collected in the same way as rubber, but from the gutta percha trees, also the leaves can be used to obtain gutta percha, while from the rubber trees the leaves are not used. Gutta percha trees grow far more slowly and the produce is smaller and of course the produce expenses are bigger. Caoutchouc (rubber) is the only big line which is attracting the big capitalists to put up money for plantations. The big push to the rubber plantations has been given by the manufacture of rubber tires for bicycles, motor cars, and since 1900 the planting of rubber has become more and more general and also the use of the rubber itself. Originally rubber came

out of the forests from South Africa, and no regular planting was known. The trees were cut down and the latex which ran out after cutting, collected. Before 1900 the world production was nearly all wild rubber, while plantation rubber was only produced in British and the Dutch East Indies. In the latter two countries we find also figures for rubber Ficus Elastica which is considered "wild" rubber. Further, we found in the Dutch East Indies the Djeloetoeng, which comes from Palembang or Borneo. The harvesting of the rubber is done continuously every day by making a cut in the bark and collecting the fluid called "latex" which comes out of the tree and which has a milk color, the latex is put into big pans, and by adding acids the rubber is put down, which process is called "coagulation."

In 1864 the first planting in the Dutch East Indies was done by a Mr. Hofland in the Pamanoekan and Tjissam lands. In 1876 the Hevea Brasiliensis has proved to be the biggest success and nearly all plantations consist of Hevea. Hevea gives everywhere in India the best satisfaction. It is grown best in a warm and moist climate and the grounds need only to be a little above sea level. Above 2000 above sea level the growing goes slower, and for the tapping of the trees has to wait longer. For the planting in the plantations they mainly use stumps, because the seeds suffer so much from disease and vermin, which can better be controlled in nurseries. Planting is done in rather big distances, 12 to 24 or 18 by 18 feet is

the most usual. In order to cover the first expenses the space between the trees is used for planting of Robusta coffee, which gives a crop very soon and will not do much harm to the rubber plantation, while it brings down the erection costs of the rubber planting. The tapping of the rubber trees is usually done in the fifth year and the quantity of the rubber produced by the tree is increased very soon. The biggest production seems to be reached when the trees are ten years old. The big plantations are rather too young to have definite, positive figures put out. After five years old the production from Hevea trees is put between 120 to 160 kilograms per bouw, but it is bigger after the trees are ten years old, and estimated about 400 kilograms per bouw per year.

The planters do not agree what is the best way to tap the trees. More than 50 per cent of the plantations use the half fishbone tapping method. After the tree is tapped the latex is collected in glass, earth or aluminum latex cups. The latex is brought into the mill in order to be treated further. In the cups sometimes the coagulation starts. The rubber produced in that way is the so-called "lump rubber." The rubber which coagulates on the tree is scraped off, and is called "scraps." The small pieces of bark which are obtained when cutting the tree afresh the next morning and the latex which has fallen on the ground is separately collected, and form the so-called "earths and shavings." The latex is brought into the mill and carefully filtered and afterwards coagulated.

The rubber is then taken out of the coagulation pans and put through machinery and worked into sheets or crepe. The sheets or crepe are dried, and if the drying is done by smoking we get the "smoked sheets" or the "smoked crepe."

What is the reason for the fact that since 1900 rubber planting has increased to such an extent? It is mostly due to the enormous consumption of rubber resulting from the manufacture of bicycles, motor cars, technical and industrial industries (appliances) which increased the demand very much. The price of rubber in London was in 1898 three shillings 8 pence to 4 shillings 4, and in 1899 up to 4 shillings 8, and these have been the prices for years before the war, with a maximum in 1906 of 5 sh. 8 and the lowest of 3 shillings in 1913. During the war prices went down to 2 shillings. High prices for raw material was the cause of many estates being opened in 1904 to 1907. The booming-world speculation was the reason for big expenses and the sudden demand for bicycles and motor cars increased the price for rubber to 5 shillings 8. The immediate result was that the planting of rubber was very attractive and promising and many of the plantations date from this time. Because of over-speculation there was a big crisis in 1907, starting in America but which still had its influence in 1908. The years 1909 to 1910 were very prosperous and big amounts were put into agricultural schemes. Prices of rubber increased continually and more and more money was put into rubber plantations, chiefly in

England, where there was a big boom in rubber which ended in a "krach," and many a big firm had to wind up its business owing to losses in speculation.

The demand for rubber and cocoanut plantations in the Dutch East Indies was so large that the price of plantations ran up and were brought into companies sometimes above the actual value. It still seems that several companies are working with a capital too big for their plantation and due to expenses at the present low rubber prices hardly can continue to work. I know of several big plantations which have considered liquidating, as with the present capital it is impossible to guarantee to shareholders a decent dividend. In Batavia the people were over-skeptical, as far as rubber was concerned, and fear of another crisis as in 1907 (the crisis had also a lot of victims in India) made the Dutch merchant very reserved, and even in 1914 only a couple of rubber plantations were officially quoted on the Batavia stock exchange. The Dutch East Indies herself has done very little for the development of rubber plantations. The most of the capital is furnished by England, Belgium, France and America. The total capital of the various rubber plantations is about 400,000,000 guilders, of which England and America furnish more than 50 per cent. The very cautious Dutch merchant is as a rule much afraid of over-production and maintains that a world production of rubber will very soon exceed the world consumption, and the consumers receive so many offers from various parts of the world that it is not diffi-

cult for them to fix the prices themselves at which they are willing to buy the raw material. In the big markets all arrivals and production figures are reported that although the buyers are not united in a buying trust, nevertheless the effect is equal, and we witnessed in 1917-1918 that American buyers were fixing the prices in such a way that prices in Java went down from fl. 1.25 to 55 cts. per half kilogram, at which price 90 per cent of the estates did not cover their expenses.

It is very difficult to give the exact valuation of rubber in Java. Rubber is valued on the color and the even white crepe and brown smoked ~~crepe~~ sheet are considered of better value than the darker or uneven smoked sheets. Of course this valuation must be of little importance. The actual (real) valuation of rubber can only be determined after chemical examination of the raw material, but still conditions have to be stipulated which must be expected from first-class rubber. Nevertheless, I expect in the very near future that the valuation of rubber will be determined by a chemical analysis certificate instead of the way in which the valuation is fixed now (i. e., determined by color). Of course at present the estates do not give special attention to the chemical part of the produce, but are satisfied as long as they deliver what the market wants and fulfill the demands of the consumers.

For the coagulation of the latex general use is made of acetic acid.

In Batavia we have at present a rubber association which fixes standard samples according to color and all local contracts are subject to the conditions of the rubber association. Both producers and exporters are members of this association. It is very remarkable that although America consumes 60 per cent of the world production, London (England), which only consumes 10 per cent, is the leading market, and the world prices are regulated by the prices ruling in London.

The various qualities exported from Java have to be classed (respectively) under the following heads:

FIRST PALE CREPE OR PRIME SMOKED SHEETS.

This is the very best rubber produced by the estates and averages from 75 to 85 per cent of the total output of a plantation. If an estate sells the prime grades separately we have the second class of rubber exported from this place—the so-called lower grades. The lower grades consist of lump rubber, scrap and bark rubber, and is mainly exported to Singapore where it is worked into blanket crepe after washing and thoroughly cleaning the material; but as a rule the plantations want to sell their output only, in which case the exporter buys several months' output, the contract stipulating approximate amount of the output, and possibly the lowest percentage of the first grades which have to be in the delivered output. Some estates guarantee 75 per cent, others guarantee 80, and there are

some estates which guarantee up to 84 per cent first grades. The difference in price in the local market between prime rubber and output rubber is from 5 to 10 cents per half kilogram. It takes a lot of trouble to induce American buyers to accept output rubber, but since the big American tire factories have their own buying agents in the local market, America is now using output rubber as well. The future of our rubber industry is to interest the big consumers of the various countries to buy in the Java market through our intermediary, and only after we have succeeded in inducing them to buy output rubber our trade will be strong enough to meet competition. The following is a statement of all rubber estates in the Dutch East Indies. In the first column the yearly estimate is put down. The second mentions the output of the last month of the year, the last column the actual output:

Estate—	1918 Estimate	Output Dec.	Output 1918
Aengsono I—II	81,818	9,126	82,864
Alas-Kedawoeng	2,500	550	2,500
Alas Soember Boto	20,000	1,150	11,888
Alas Tledek	5,000	1,100	4,700
Anim Sand I—IV	75,000	10,128	85,029
Artana	2,000	288	2,399
Assnan	12,000	1,567	13,092
Badek	63,503	10,895	64,705
Bajabang	320,000	26,060	318,060
Bajoe Kdoel	162,500	16,880	151,423
Baleardjasarie		19,460	100,959
Balong (Governments)	43,725	3,345	44,319
Bandjarsari (Bandjar)	17,750	nil	15,345
Bandjarsari (Djember)		3,511	25,370
Bandoeardjo	160,000	20,268	178,026
Bangkeloeng-Kolot	75,000	8,237	81,719

Estate—	1918 Estimate	Output Dec.	Output 1918
Banjoemanis (Governments)	38,175	1,445	36,721
Bantardawa	113,398	14,868	103,353
Bantar Djaja	135,000	12,117	133,658
Batoe Djamoes	30,000	2,785	25,661
Batoe Lawang	108,000	9,410	108,831
Bandoengan	375	nil	109
Binangoen	100,000	7,459	96,064
Blimbing (Governments)	120,000	10,170	112,930
Bodjong Gadeh	13,500	1,473	16,071
Bodjong Terong	16,250	1,421	14,781
Boemi-Ajoe (Wingi)	122,470	....	....
Boemi-Ajoe (Tjandjoer)	25,500	2,368	23,851
Boemi-Aroem & Charlotte	1,200	35	816
Boemi-Ajoe & Tjondong	250,000	18,340	248,844
Boenisari	100,000	6,704	94,606
Boewaran (Governments)	85,000	5,789	57,150
Bolang	330,000	24,715	293,698
Branggah Banaran	226,796	....	....
Danoerodjo I—II	20,000	1,793	15,614
Dilem	20,000	1,224	18,267
Djambong	....	....	....
Djagernaik	....	380	2,503
Djaloepang	....	5,276	39,556
Djamboe, Sodong en Tjilaket	25,000	nil	25,000
Djampangan	3,000	nil	1,500
Djarangan	294,835	31,975	275,316
Djasinga	....	27,788	305,955
Djatikalangan	45,359	6,042	45,904
Djati Roenggo	9,300	930	9,176
Djatirono	62,500	7,171	64,938
Djolondoro	30,000	3,571	21,911
Djongrangan	1,000	nil	nil
Doerdjo and Sentoel	182,000	18,000	150,000
Donowarie	150,000	12,000	110,093
Ganessa	24,000	1,873	22,097
Garahan Kidoel	30,000	4,865	41,692
Geboegan	5,000	nil	4,303
Gerengredjo	20,000	2,412	19,788
Getas	25,000	2,260	21,095
Gledagan Pantjoer	157,500	10,171	126,940
Glen Falloch	36,287	5,165	42,570
Glenmore	56,750	9,603	66,312

Estate—	1918 Estimate	Output Dec.	Output 1918
Gloensing	97,069	9,787	97,069
Goenoeng Bitoeng	190,000	14,980	184,241
Goenoeng Gadjah	16,000	900	....
Goenoeng Hedjo	35,000	3,287	36,510
Goenoeng Koepak	130,000	8,310	114,555
Goenoeng Kantjana	1,500	139	1,811
Goenoeng Majang	54,000	8,000	48,847
Goenoeng Sari & Pengoeloeran	409,090	29,826	332,727
Goenoeng Sindoer	695	249	696
Goenoeng Soesoeroeh	40,000	3,590	40,173
Goenoeng Toenggal	85,000	7,723	92,504
Gogonitie	52,835	7,603	80,493
Gondang	33,000	5,115	36,162
Kahoeripan	....	3,639	41,074
Kalibadjing	37,500	5,042	31,174
Kali Bakar	50,000	nil	50,000
Kali Bendo	33,000	3,413	34,180
Kali Djeroek	90,000	9,195	96,145
Kali Djompo	36,000	4,754	39,163
Kali Doeren I	49,442	4,831	49,464
Kali Doeren II & Kali Glagah	122,470	....	....
Kali Glidik	....	nil	247
Kali Kempit	150,000	18,242	142,039
Kali Klattak	7,000	....	....
Kali Klepoeh	140,000	15,000	131,732
Kali Klepoeh-Goenoeng Passang	54,545	6,714	57,047
Kali Minggir	204,300	20,087	186,633
Kali Mrawan	61,363	6,510	58,124
Kali Padang	159,000	17,000	156,000
Kali Redjo	50,000	6,516	45,455
Kali Selogiri	48,359	5,450	35,710
Kali Spenadjang	30,000	4,882	37,913
Kali Telepak	136,200	1,688	99,801
Kalitelo (Governments)	133,000	7,660	106,990
Kali Tello	7,000	1,685	11,335
Kali Tengah	175,000	14,187	158,410
Kaliwringin (Governments)	40,050	1,953	17,619
Kaoempandak	500	70	390
Karang Anom	112,500	14,795	127,502
Karang Geneng	5,000	nil	nil
Karang Nongko	2,500	100	1,500
Kasmtoe	254,545	26,990	228,369

Estate—	1918 Estimate	Output Dec.	Output 1918
Kebonso	50,000	nil	20,623
Kedaton II-III & Bedean	100,000	10,235	104,676
Kedawoeng	55,000	3,973	47,441
Kedoeng Badak en Tanah-Sareal	18,000	1,620	17,660
Kedeng Lemboe	225,000	30,215	221,320
Kepoetren	27,216	....	....
Kiara Pajoeng	250,000	21,200	218,026
Klatakan Petoengredjo	50,000	8,193	62,819
Klein Getas	30,000	nil	15,925
Koeripan	....	3,848	33,714
Kroempoet (Governments)	26,470	2,238	27,727
Kroewoek	200,000	25,000	231,749
Lajoengsari	8,000	638	8,222
Langen	....	26,683	248,371
Langsepan	400,000	39,964	410,090
Lebak Bolang	115,675	11,515	128,629
Lebak Parai	....	735	7,151
Lebak Redjo	3,000	305	2,664
Lebak Roto	15,000	1,302	13,801
Lengkong-Goedang	785	....	....
Lengkong Oost	7,000	....	....
Lemah Neundeut	288,000	27,373	270,420
Lidjen	....	....	....
Limburg	500,000	64,826	548,780
Loegede	....	50	2,000
Madjau	21,000	1,442	12,192
Mangir	2,600	nil	2,316
Manoewoen Moekti	40,000	3,909	34,150
Margaredja	100	45	158
Melambong	2,000	nil	1,545
Meloewoeng	95,000	12,240	99,626
Merboeh (Governments)	150,950	8,200	83,783
Mergokarahardjan	45,000	4,000	41,750
Michiels Arnold	26,980	2,804	25,369
Miramontana	7,000	....	....
Moemboel	115,000	15,285	116,460
Moenggoer	2,000	232	1,612
Molioardjo	200,000	20,235	205,100
Montjolimo	2,500	nil	nil
Nagara	25,000	2,469	24,291
Ngadiredjo	6,000	nil	3,989
Nanggoeng	50,000	5,483	49,495

Estate—	1918 Estimate	Output Dec.	Output 1918
Egobo	23,000	2,500	31,925
Ngrowo Seneng	4,000	7	1,384
Nieuw Tjisalak	120,000	12,462	142,620
Njoenjoer en Bintang	6,000	nil	4,558
Noesakemgangan	112,500	8,331	107,001
Pagger-Goenoeng	50,000	8,252	52,538
Pacouda	25,000	2,147	24,375
Pakellan	7,000	1,500	9,000
Panggoeng	8,000	615	8,333
Pangledjar	105,000	9,082	100,870
Pangleseran	10,000	451	10,656
Panjindangan-Giriawas	100,000	9,400	108,000
Panoembangan	15,000	1,337	15,906
Pantjoer Sarie	150,000	20,015	167,000
Parakan Salak	60,000	7,441	87,480
Pasir Ajoenan	225,000	14,888	227,185
Pasir Bengkok	11,473	1,519	12,012
Passirboengoer		16,439	126,494
Pasir Karet		nil	122
Pasir Monetjang		7,199	55,545
Pasir Oetjing	250,000	14,900	202,265
Pasir Pogor	50,000	5,879	47,383
Pasir Soeren	18,000	628	15,783
Pasir Waringin	225,000	15,882	246,609
Pegoendangan	68,039	6,389	65,771
Penandjoeng Mandalareh	140,000		
Pengadjaran		1,053	10,384
Petoeng Omboh (Dampit)	750	nil	692
Peong Ombo	45,359	5,929	44,211
Poerbojo	215,456		
Perwodadie	75,000	10,808	76,295
Poerwodojo	108,803	5,391	108,802
Pondok Gedehlanden	560	146	766
Radjamandala	4,800	415	3,986
Raijap		nil	126
Rantjatapen	140,000	11,457	131,882
Redjo-Agoeng	7,000	849	2,773
Rini		4,550	24,991
Sadeng djamboe		162	1,616
Salatri	12,500	1,250	15,413
Samoedra	18,000	2,205	14,422
Sampang Peundeuj	90,000	7,291	80,684

Estate—	1918 Estimate	Output Dec.	Output 1918
Sampora	70,000	5,750	70,166
Sariredja	....	4,668	25,671
Sawo Djadjar	100,000	....	....
Selokaton	....	....	....
Sengon	95,254	....	....
Setjang 1 & 2	....	10,100	12,935
Sido Redjo	15,000	990	10,230
Silalangoe	....	886	11,391
Silo Sanen	3,589	nil	3,589
Simo Blagong	100,000	8,548	93,165
Sindoe Agoeng	10,000	793	12,013
Soebah (Governments)	27,500	1,125	7,109
Soebang	....	14,133	114,696
Soedimara (Governments)	4,000	1,213	2,394
Soejadi	....	nil	3,034
Soekakaret	....	2,251	34,145
Soekamangli	55,000	4,562	42,398
Soekamadjoe (Tjibadak)	68,000	4,731	53,694
Soeko Rame	40,000	7,010	47,010
Soekokoelon	160,000	10,105	160,146
Soember-Agoeng	48,000	5,531	48,787
Soember Ajoe	92,616	10,669	93,097
Soember Aroem	10,000	1,000	11,087
Soember Djeroe	85,000	12,000	91,000
Soember Doeren	162,293	....	....
Soember Gesing	6,000	844	8,540
Soember Kerto	60,000	6,200	52,820
Soember Mandjing	60,000	354	29,878
Soember Mangis Kidoel	90,000	9,641	86,365
Soember Mas	204,117	19,149	189,169
Soember Nongko (Pasoeroean)	33,750	3,399	35,011
Soember Nongko (Kediri)	40,000	3,095	33,645
Soember Pakel	3,000	nil	2,700
Soember Perkoel	226,796	....	....
Soember Rowo	181,437	....	....
Soember Sengkaring	7,500	851	9,784
Soember Soeko Tangkep	453,953	....	....
Soember Telogo	55,000	6,212	56,449
Soember Tengah	104,545	12,473	110,203
Soember Tenggoelon	95,000	10,583	91,197
Soember Tjoeling	140,000	15,247	137,567
Soember Woeloe	60,000	6,465	40,592

Estate—	1918 Estimate	Output Dec.	Output 1918
Soember Woeloe	77,111	...	...
Soember Barang	...	9,858	70,387
Soerowinangoen	65,000	7,018	71,084
Sonowangi	90,719	...	...
Swaroe Boelcerotto	2,000	nil	2,979
Sringin	2,500	nil	2,222
Tamboen	...	2,410	26,186
Tandjoeng Oost & Tjiboeboer	...	...	...
Tarik Ngaroom	30,000	2,296	20,400
Tegal Harendong	31,000	2,800	29,580
Tegal Waroelanden	...	67	651
Telogo Redjo en Wonosari	...	27,270	275,500
Tendjolaja	5,400	697	6,525
Tjemara	6,250	110	3,821
Tjigara	86,000	5,700	90,158
Tjiastana	100,000	8,711	110,506
Tjibantjet	50,000	4,582	62,120
Tjibentaro	78,000	4,300	75,800
Tjibodas	500	nil	339
Tjiboengoer	40,000	4,455	48,544
Tjiboeni Tjipongpok	160,000	9,337	137,327
Tjigantri	6,000	...	...
Tjigembong	42,500	3,820	45,636
Tjikadoe Rangkas Betoeng	180,000	17,372	225,421
Tjikantjoeng	162,386	13,570	120,140
Tjikantjana	10,000	1,095	10,397
Tjikasso	150,000	8,777	127,162
Tjikoempaj-Tjipinang (Gov.)	97,000	8,342	79,800
Tjikoelang	120,000	10,954	90,083
Tjilangla	52,500	4,889	51,936
Tjileboet	1,000	117	1,254
Tjilentab	143,000	12,941	167,648
Tjiloear	30,000	...	...
Tjimangooed	88,000	7,562	80,264
Tjimatis	50,000	4,308	37,584
Tjimoelang	65,000	6,093	65,006
Tjiogreg	15,000	1,750	17,863
Tjioemboeleuit	2,700	183	2,563
Tjipangparang	60,000	4,155	61,754
Tjipari	287,000	19,159	193,293
Jjipeo	...	11,949	96,200
Tjipetir	...	2,412	71,439

Estate—	1918 Estimate	Output Dec.	Output 1918
Tjipetir (Government)	120,00	9,202	110,295
Tjirandji	150,000	13,750	152,252
Tjirangkas-Bitoeng	7,000	428	4,128
Tjisalak	....	19,944	120,216
Tjisela	800	135	1,105
Tjiseroe	334,000	30,117	300,720
Tjilalahab	....	nil	2,922
Tjitrap	4,000	....	....
Tjiloewak	1,500	110	1,443
Tjoeroeg	160,000	nil	124,812
Tjioeroek	40,000	2,327	31,787
Tjorah Mas	29,484	....	....
Tlogo	....	1,545	10,880
Took Bandoeng	5,000	nil	5,034
Trebla sala	50,000	6,997	48,865
Tretes (Governments)	26,575	2,402	19,809
Tretes Panggoeng	4,000	nil	3,485
Vada (Governments)	67,050	5,006	53,506
Woorwaarts-djae	10,000	nil	nil
Wangoen Redja (Soekaboemi)	60,000	4,250	61,219
Wangenredja	....	10,797	97,235
Warnasarie	18,000	2,007	18,205
Widodaren	50,000	5,204	47,000
Wilhelmina	20,000	2,401	23,512
Wonokoio	6,000	nil	1,240
Wonokoio	....	....	....

EAST COAST OF SUMATRA.

Estate—	1918 Estimate	Output Dec.	Output 1918
Adolina Oeloe	90,000	9,991	99,038
Ajer Poetih	....	35,277	357,718
Amhalceloe	80,000	....	....
Bah Najoe	4,500	1,221	7,800
Bah Boalian	60,000	6,758	72,348
Bah Enda	54,000	4,344	53,409
Bahilang	....	27,973	....
Balai Katjang	30,000	2,300	28,216
Balai Gadja	75,000	9,149	82,259
Bandar Kwala	435,000	37,576	449,530
Bandar Maria	160,714	14,768	158,122
Bandar Nogri	215,000	....	....
Bandar Pinang	203,090	17,500	190,120
Bandar Poolau	....	6,687	57,530

Estate—	1918 Estimate	Output Dec.	Output 1918
Bandar Slamat	....	18,630	227,419
Bandar Taloe	110,000	9,794	94,298
Bangoen Poerba	249,456	25,880	252,380
Basilam	190,000	18,500	177,970
Batang Trap	15,000	1,774	18,067
Bateo Gingging	154,500	13,250	161,900
Batoe Lokong	180,000	12,360	149,721
Batoe Nanggar	....	7,124	79,243
Batu Rata and Si Mahe	190,509	20,001	198,518
Bebirah	11,000	....	....
Begerpang	326,589	24,201	240,505
Beloeroe	....	nil	nil
Bengabing	80,000	10,189	94,010
Biawak	35,534	25,401	432,578
Blankahan Soengei Roean	186,600	17,237	182,798
Boekit Lawang	15,000	3,500	21,707
Boekit Pajong	10,000	nil	nil
Boeloe Telang	317,100	32,208	382,145
Brussel	400,000	23,049	337,475
Bukit Seotang	....	13,154	115,662
Calixberghe	136,080	9,510	108,199
Carolsburg and Johannesburg	....	275	3,192
China Kasih	....	13,246	131,691
Deli Moeda	250,000	23,952	261,844
Dolok	175,000	16,801	173,408
Dolok Baros	21,600	2,275	22,828
Dolok Masihoel	65,000	4,551	54,752
Dolok Merangir	61,250	4,100	61,700
Dolok Oeloe	90,000	7,367	80,787
Doesoen Oeloe	50,000	5,241	50,011
Gallia	160,000	15,027	162,740
Gergas Estate	68,181	8,318	60,826
Glen Bervie I	124,738	9,871	108,923
Goenoeng Panela	....	6,783	74,723
Goerach Batoe	....	30,932	318,670
Greahen	160,714	15,642	153,729
Heindale	....	12,059	143,307
Hessa	12,000	1,253	9,966
Hevea	80,000	....	....
Kaloendang	204,000	14,985	176,362
Kotangan	160,000	16,433	178,100

Estate—	1918 Estimate	Output Dec.	Output 1918
Kotari	50,000	5,370	49,809
Kemoening	40,000	4,916	47,799
Kisaran	....	39,716	369,313
Kerasaan	....	1,788	11,870
Kwala Krapoh	31,000	2,890	29,819
Kwala Pessilam	259,410	20,709	205,143
Kwala Piasa	....	7,146	71,420
Kwaloe Rubber Estate Ltd.	....	11,726	114,408
Lantassan Estate	188,241	15,506	162,278
Laut Tadon Estate	....	656	6,470
Liberia	....	20,221	251,141
Liberta Perdangan	110,000	12,413	116,486
Lima Poeloe	211,380	....	....
Limau Manis	....	15,642	147,396
Mahanda	160,700	14,213	157,369
Marihat Baris	180,000	14,384	169,315
Marihat Oeloe	162,000	12,732	152,045
Menbang Moeda	2,000	355	3,172
Mendaris ‘B”	34,019	6,330	42,560
Milano	24,000	2,660	23,600
Naga Timboel	250,000	28,475	220,615
Namoe Oengas	99,954	....	....
Namoe Rambei	302,045	27,167	244,589
Padang Toealang	308,040	23,304	284,001
Paija Mabar	40,000	4,161	36,008
Paija Pinang	63,682	5,667	69,190
Pangkattan	381,081	....	....
Perdangangan	1,400	155	1,450
Pergadingan	....	11,944	94,580
Petatel	141,000	8,923	135,012
Poelahan	25,000	3,113	25,870
Poeloe Tager	150,000	9,900	114,000
Pondok Pandjang	....	50,960	476,651
Priok	75,000	8,429	80,443
Salahadji	95,000	9,055	93,000
Sarang Giting	160,000	14,500	156,500
Sennah	15,000	2,112	19,211
Sentang	....	11,596	142,223
Serapoh	70,307	8,428	67,724
Serbadjadi	200,000	23,862	240,002
Serbangan	....	34,197	386,900
Siak Estate	....	....	....

Estate—	1918 Estimate	Output Dec.	Output 1918
Siantiar Estates	89,814	nil	89,320
Si Alang	136,364	14,437	129,128
Si Boelan	46,000	6,536	52,633
Silau Doenia	100,000	9,508	100,800
Silau Toewa	70,000	6,762	65,954
Silinda	187,000	13,143	143,422
Simpang	75,000	8,240	77,910
Si Marito	226,796	nil	137,834
Simpang Ampat	264,500	....	....
Sinampoer	70,000	4,836	58,641
Si Pare Pare	186,000	19,207	139,954
Soeka Radja	90,000	10,365	93,911
Soengi Baleh	....	17,569	233,220
Soengi Bamban	70,000	3,990	47,000
Soengi Bedjangkar	210,000	11,938	214,206
Soengei Biroeng	89,359	7,102	57,286
Soengei Noenoe	....	21,566	239,227
Soengei Brohol	81,647	4,781	50,960
Soengei Dadap	....	26,728	301,140
Soengei Karang	....	20,131	229,836
Soengi Kari	....	13,220	132,282
Soengi Krapoh	45,000	4,051	41,514
Soengei Mangkei	325,000	25,121	255,850
Soengei Merah	126,275	12,318	127,176
Soengei Moesam	30,000	3,300	33,722
Soengei Parit	62,500	9,190	64,092
Soengei Poetih	225,000	24,254	256,026
Soengei Raja	27,000	nil	nil
Soengei Rampah	99,790	8,754	99,790
Soengei Sikassim	....	34,781	377,474
Soengei Silau	....	19,270	186,267
Taloen Saragih	145,000	17,718	157,742
Tamboenan	108,863	9,235	94,472
Tanah Besih	246,301	27,743	307,096
Tanah Datar	58,000	4,643	59,925
Tanah Hitam Hilir	58,000	4,771	52,383
Tanah Radja	....	39,943	313,276
Tanah Radja (Bedagei)	270,000	26,889	273,493
Tandjoeng Bringin en Tamaran	335,250	31,279	338,767
Tandjoeng Doerian	100,944	6,418	98,000
Tandjoeng Garboes	70,000	8,230	81,709
Tandjoeng Kassau	198,862	....	....

Estate—	1918 Estimate	Output Dec.	Output 1918
Tandjoeng Maria	176,921	17,423	170,923
Tandjoeng Marah	181,660	13,706	181,617
Tandjoeng Poetri	150,000	17,108	164,991
Tebing Tinggi Estate	140,000	13,503	138,749
Telok Dalam	304,750	35,117	351,358
Timbang Deli	100,000	8,910	100,530
Titian Oerat	183,000	....	....
Tjabang Doea	18,000	7,396	74,937
Tjinta Radja	15,855	1,581	18,933
Toerangie	127,272	10,507	110,683
Atjeh & Onderhoorigheden			
Batang Ara	90,000	10,461	94,348
Damar Sipoet	46,000	4,676	16,683
Gadjah Meuntah	55,000	6,072	49,000
Langsa (Governments)	130,000	6,408	94,688
Langsar	210,000	21,516	214,531
Modang Ara Estate	65,000	4,057	34,337
Mopoli	105,000	15,513	120,574
Semadam Estate	20,000	2,485	23,855
Simpang Kiri	17,500	2,722	19,561
Soengei Ijoe	25,000	1,977	20,687
Soengei Lipoet & Boekit Rata	520,000	39,764	437,344
Tamiang, Oepah & Rantau	303,907	25,310	309,561
Tandjoeng Genteng	10,000	nil	nil
Tandjoeng Semantoe	80,000	7,100	74,061
Tapanoeli			
Batang Toroe	235,000	20,500	235,500
Napesong	240,000	22,000	245,000
Malamboe	180,000	16,000	180,000
Penang Sare	145,000	14,302	149,760
Sumatra West Coast			
Moeara Aani	12,000	1,009	11,989
Timboeloen	18,000	....	....
Lampong District			
Egaharap	85,000	6,911	57,803
Gadies	140,000	13,767	140,071
Kedaton	181,000	20,000	196,229

Estate—	1918 Estimate	Output Dec.	Output 1918
Langkapoera	50,000	4,911	35,030
Negerija	80,000	90,000	87,000
Redjosari	150,000	15,474	152,081
Rotterdam I	85,000	7,195	81,687
Soengei Langka	20,000	2,105	13.358
Waihalim	42,184	7,660	45,783
Wai Lima & Kedongdong	115,000	13,000	118,800
Palembang			
Poeloe Rimau	2,400	....	....
Djambi			
Batang Hari	25,000	2,304	24,940
Riouw & Onderhoorigheden			
Boelan	....	15,587	108,085
Djapoera	200,000	15,073	195,000
Gading & Ajer Moelek	130,000	11,739	108,625
Galang Besar	200,000	13,656	143,583
Kapala Djori	56,699	....	....
Noembing	160,000	13,329	125,221
Soegi	15,446	1,235	14,576
Soengei Lalah	90,719	10,623	119,145
Soengei Samah	6,000	600	6,800
South-East Borneo			
Danau Salak & Atajoe Estate	....	nil	72,186
Hayoep	236,366	16,187	204,877
Tanah Intan	78,108	6,804	76,348
West Borneo			
Kapoewas	118,182	10,900	113,182
Nanga Djetah	40,000	3,867	41,941
Raja	21,000	1,617	22,493
Siapat	....	....	....
Tjempaka	....	1,735	18,600
West Borneo Kautschuk Plantage	50,000	4,304	46,200
Menado			
Bojong	200	nil	21
Kalasey	1,500	nil	1,327
Tiniawangko	30,000	....	....

Rubber is packed either in veneer chests or Java chests, but the former ones have the preference as per cubic metre they can contain more rubber. The weight of the chest is not constant, and it is now brought before the Batavia Rubber Asssociation to get constant net weight per case.

As mentioned before the quality of rubber is judged at present by its color and its elasticity. For crepe the lighter the color the better and for sheets an even brown color is considered at present the mark of good quality. The shipping ports for rubber are Padang, Belawan, Tandjong Bali, Batavia, Semarang and Soerabaya.

SPICES.

Pepper.—In the trade pepper is known as white and black pepper, but both grades are the fruit of the same plant, and the only difference is the way of preparation. The preparation of white pepper takes more care and consequently is more expensive.

Pepper is the fruit of the Piper Nigrum L., which plant is found all over the Indies, but for the export trade the pepper grown in the various districts of Sumatra and Banka are practically of interest only. The Government gives the following figures for planted areas:

Palembang, 337 bahoes.
Lampongs, 7390 bahoes.
Banka, 7623 bahoes.
Atjeh, 8800 bahoes.
Java, 1200 bahoes.

Outside of Java, where pepper is grown more on a plantation base, natives grow pepper in a very primitive way. As a rule the forests are cleaned up and for two or three years such obtained fields are planted with rice (dry rice fields); after this the pepper is planted and these native gardens remain uncared for until the pepper dies, which takes from ten

to twenty years. The native does not give the proper care to his plantation and only when prices of pepper are high proper fertilizing is done.

It is practically impossible to give exact figures regarding black pepper outputs and the so-called official Government statistics vary between 15,000 to 25,000 tons. The yearly white pepper output can be put to be about 5000 tons.

Pepper is sold in the Batavia market exclusively and the market is in hands of Chinese and native speculators. All efforts to cut out the speculation have been vain, and even the big catastrophe in 1911, when the Koloniale Handel & Consignatie My cornered the pepper market and Chinese speculators had to pay 20 to 30 guilders price differences, did not have the wanted effect.

The main reason is that pepper is sold on time delivery, and in March and April the Chinese speculators start to sell October-November deliveries and differences can be big. In March-April, 1919, pepper was sold for October-November at fl. 35, whilst the pepper price at time of delivery was fl. 45, a picol, and many of the small speculators failed.

Another drawback in the black pepper trade is the impossibility of getting the Chinese sellers to supply an about dust-free produce, but it has been impossible to get the producers to deliver such a produce, and buyers have to receive pepper with 5 per cent dust as a maximum.

White Pepper.—To produce this kind of pepper the

natives harvest only the ripe berries, which have to be red at the time of collecting; the berries are stamped with the feet to loosen them from the stems, and then put into bags and put in running water for ten to fourteen days to loosen the peel.

After this process the berries are thoroughly washed in clean water until only the white seeds remain, which are dried in the sun. In case the white pepper is packed before totally dry, a part of the seeds turn black and the pepper will be inferior and liable to get claims from buyers at the other end.

The white pepper is mainly produced at Banca, and therefore called after the port of export, Wh. Muntok pepper.

In Bintoehan an inferior white peper is produced, which many times is mixed with the better Muntok pepper, the latter fetching a higher price.

Black Pepper is made in a very primitive way. The natives collect green and red berries and hardly ever wait till the fruit is properly ripe; the stems are separated in the same manner as with the white pepper and afterward the pepper is put in heaps to ferment and then dried in the sun. Owing to this careless way, pepper is easily made mouldy and special care has to be taken when purchasing from the West Coast of Sumatra. The pepper from the Lampongs, if not mixed with the other grades is as a rule good and the seeds are heavy in weight.

Export is mainly directed to U. S. A., Holland, and some to England.

The business on the Batavia market is for an European export firm, which has to fill a big order extremely difficult. There are very few dealers who sell over 2000 picols (about 125 tons) at a time, and as soon as a sale is reported other dealers immediately put up their price with f. 0.25-f. 0.50 a picol, and it is practically impossible to keep a transaction secret for longer than a couple of hours.

The pepper is packed in new bags as a rule of one picol net.

NUTMEGS AND MACE.

The nutmeg is one of the spices which is mainly grown in the east part of the archipelago. New Guinea, Banda, Ambon, Celebes are the bigger producers, while there are also a few estates in Java.

The nuts from New Guinea are called Papoea nutmegs. These are oblong of shape and considered to be inferior to the real nutmegs, which are round in shape.

The Papoea nuts are the fruit of the Myristica Argentea, the Banda nuts fruits of the Myristica fragrans Houtt.

The plantations outside of Java are nearly all neglected and look sometimes like a regular wilderness. The trees start to produce after ten years and continue then to have flowers and fruit the whole year through for over fifty years, the biggest produce being from January to March.

The fruit consists of the well known nut enclosed in a shell which is surrounded by the mace, latter has a red color. This again is enclosed in a hard peel which opens when the fruit is ripe.

While plucking, the mace and nuts are kept separately and at the same time a kind of sorting of the

nuts takes place. The nuts are dried above a small fire, which process has to be done very carefully. After this the shell is broken with a wooden hammer, after which the nuts are put over sieves to assort them according to size.

The qualities are indicated as follows:

Nuts 85-90, which means 85-90 nuts per ½ kg.; 110-115, 130-135, meaning nuts 110-115 and 130-135 nuts per ½ kg. Further, the shriveled nuts and wormeaten nuts and pieces are assorted and sold separately.

After assorting the nuts, they are placed in quick lime in order to protect the nuts from insects and depravation, and dried again. This process gives the nut the well known white appearance.

The nutmegs are packed in cases of about 75 kg.

The proportion between produced nuts and mace is about 100:16.

The total production is about 1,500,000 kilograms, which is mainly exported to the U. S. A. and Holland.

Mace.—When collecting the nuts the mace is separated very carefully with the hands in order to keep the mace double leaved; in case the mace splits, the produce is called single leaved.

The mace is dried in the sun for a day and then folded flat and dried for another couple of days, and then assorted according to color and defect and damaged leaves, and packed in cases of 250 kg.

CLOVES.

Are grown in Amboina, Java, Padang and Benkoelen and they are dried flower buds which are known as cloves.

There are various kinds of trees producing cloves, the best being the Eugenia caryophyllata thumb. The clove plantations are exclusively native plantations, consequently badly kept up.

The export trade calls cloves Amboina cloves, but it is understood that also Sumatra-Java cloves can be delivered. The name dates back to the seventeenth century, when Amboina was the only producer for the world market.

Zanzibar, Pemba, Bourbon, Madagascar are the big producers and the two first deliver about two-thirds of the world consumption.

The tree is in blossom twice a year, July and December, the flower buds are collected and dried in the sun for a week, sometimes a slight drying process on a wood fire is combined with the sun-drying process.

The D. E. I. produce between 100,000 and 200,000 piculs.

Cinamon and Cassia Vera. Although there are some

native plantations of the Cinamon trees, the total output of the D. E. I. is very small, about 50 tons, but the Cassia Vera, which belongs to the same kind of produce, is largely planted in Sumatra. The Cassia Vera is produced by the Cinnamomum Cassia Bl. and original slips of the tree are imported from China.

The tree is treated in such a way to produce as many twigs as possible, the twigs are cut when they are about 3 c. m. thick and the bark, which is the cassia, cut off in pieces of about 30-40 c. m. The pieces are dried and assorted according to color and length and put in bundles.

The Cassia is assorted—three grades. The first grade must be even pieces, gold-brown colored inside and brown outside.

The total output is about 1000 tons a year.

Practically all Cassia is exported from Padang or from there via Batavia.

COCOA.

Planting of cocoa trees which originated in America, was originally introduced to the Dutch East Indies in the latter part of the 16th century by Spaniards, and they started some plantations in the northern part of the island Celebes, but this trial did not prove to be successful and in the latter part of the 17th century we do not find any more mention of these plantations. The impetus in the planting of cocoa trees was given in 1880 to 1890 when in middle Java big coffee plantations suffered to such an extent from a certain plant disease that they had to stop coffee-planting and look for another commodity to deal in, in order to keep in existence. This is the first time that actual cocoa plantations were properly started in Java, and mainly in the middle of Java cocoa plantations proved to be a great success.

The kind of cocoa used in Java is the Theobroma Cacao L, of which there are many varieties, amongst others, Criollo and Forastero. The fruit of the cocoa of the Criollo variety are red or yellow with very deep wrinkles and thin shells and without the

wooden tops of the Forasteros. The cocoa beans are white or slightly colored, and round or flatround in form, while the cobs of the Forasteros have a hard wooden-like top, and the beans are dark in color and very flat in form. The Java Forasteros have nearly all originated from seeds from the estate of Djati Ronggo. Cocoa planting is very difficult and needs a lot of care in order to avoid sickness and plagues.

The very high needs for cocoa planting caused in the beginnng the failure of several estates, but this was cured, while in 1900 a test station for cocoa was erected in Salatiga, the director of which, Dr. L. Zehntner, has done a lot for the cocoa planting in Java and his examinations and experimentations have proven to be of great assistance to the cocoa planters. The cocoa estates are chiefly located on the sides of mountains where they do not suffer from the heavy winds. The climate must be warm with a minimum rainfall of 2000 millimetres a year. Dry periods are very harmful. The soil must be of clay and porous. Java Criolla can be planted about 1500 feet above sea level and needs more care than the Forastero which can grow 2500 feet above sea-level. The soil has to be cleaned thoroly before planting and all trunks and roots of trees have to be removed and if the ground has been planted before the soil has to be worked thoroly, before the planting of the cocoa can be started to avoid the communication of disease germs from the very start. Further, special care must be given to the drainage of the ground,

and about three months before the planting starts the plantholes are made, and shadow-trees are planted. The shadow-trees are as a rule planted 24 by 24 feet and are not so much planted for protection from the sun as a protection against the heavy winds. The cocoa seeds are put out in nurseries first and six months later are brought over to the plantations. The Criollas are planted 15x15 feet (15 feet apart) and the Forasters 18x18 feet. The young trees are protected in the beginning by small individual roofs. Special care is given to fertilizing and the soil is worked regularly.

The difficulties connected with cocoa practically made it impossible for the natives to make it a native culture. Cocoa is often planted in combination with coffee and rubber, and from official government inquiry (government statistics) there were 10,500 bahoes (1 bahoe equals about 1.7 acre) planted with cocoa, and mixed, about the same. They calculate 3 pounds of cocoa per tree or, when planted about 15 feet apart, about 6 piculs, and 18x18 feet, about 4 piculs per bouw a year. The crop is continuing the whole year around, but the main crop is from May until July. The trees start to bear fruit after four or five years, while the fruit require from five to six months to ripen. When shaking ripe fruit you can hear the beans rattle. The harvesting of the cocoa fruit has to be done with sharp knives in order to do as little harm as possible to the tree. Only good, ripe fruit give a good product. The fruit

is opened on the plantation and the beans assorted there in the first and second quality. The first grade comes out of the good fruit, while the second quality is made from fruit which have been worm-eaten. Then the beans are brought to the mill where they are fermented in wooden tubs from about 500 lbs. weight contents, the tubs having holes of about a half centimeter at the bottom. The contents of these tubs are once or twice daily turned over or brought over to another tub and after three to four days fermenting, the beans are washed and left in the tub to ferment for one more night, after which the beans are dried in the sun heat which takes as a rule from eight to ten days. The big estates dry one or two days in the sun and continue the drying process in heated air in dry houses. The drying process is finished when the outside of the bean has a light stone red color. The first and second kinds have already been kept separate but now a further selecting is made according to the size of the beans.

The export from Java of Cocoa is an average of 2000 tons a year. The biggest consumers are Holland and next England. Also to a certain extent the United States are buyers. In the New York market Java Cocoa always gets the top prices, which is mainly due to the great care taken in Java in growing and finishing the produce. Java Cocoa has a special good name on the Amsterdam produce exchange and is always paid better than any other

kind. Owing to the very light brown color it is very suitable for mixing purposes. The prices in Amsterdam per pound were averaging before the war between 44 to 65 cts. This article as the produce of the estates is many times bought by Chinamen is an object for local (Indian) speculations and big differences in prices are noted. In 1911 the highest prices in Java was fl.75.– per picul, the lowest fl.39.–. In 1913 the highest price was fl.70.–,the lowest price fl.45.– per picul. In 1916 and 1917, being war years, there has been little variation in the market; the lowest price was fl.42.–, the highest price was fl.52.–. Now that the war is over the prices are very steady again and fl.75.– to fl.90.– have already been paid. The cocoa estates do not make big profits owing to the special care which has to be given to the planting and which puts the cost price of the raw produce comparatively very high. The Java produce, compared with the world production, is about one per cent, the biggest producers being the Gold Coast, Africa, Santhome, Equador, Brazil, Santa Domingo, Trinidad and Venezuela. The world consumption over 1913, 1914 and 1915 was estimated to average 250,000 tons. With a world production of 255,000 tons, the Java production is about 2000 tons. The big world consumers are the United States, for 25 per cent; Germany for 20 per cent; England, France and Holland each 10 per cent.

Java Cocoa has a very weak taste and is not suitable to be used as nutritious fruit without mixing it up with other kinds. This is one of the reasons why

the manufacturing of chocolates in Java has not started. The cocoa trade in Java is done in two ways. Either the merchants buy one certain grade for which they have of course to pay a certain price, but the best way to do is to buy an estate's output for a running year at an average price. The contract has to state how much No. 1, No. 2, No. 3 and No. 4 grade that certain estate is allowed to deliver. The bigger estates are only willing to sell total crops. In Batavia there are small quantities coming into the market from Buitenzorg and Preanger which can be bought on sample.

Cocoa is packed, as a rule, in heavy gunny bags of 2 piculs per bag. For some countries the buyers make a special stipulation to have the packing in either bags of 112 pounds or 50 kilos.

The quality when buying is judged, in the first place, by the color of the beans, and, second, the size of the beans. The bigger the bean and the lighter the color, the more valuable the Cocoa is.

Cocoa is mainly shipped from Batavia, Semarang and Soerabaya.

TIN.

Tin is of very big interest to the Government of the Dutch East Indies, as the big tin mines in Banca belong to the Government, who acts here as producer and sells here at present direct to the tin exporters. Of course we do not know what will happen as soon as peace is definitely signed, but the general opinion is that the tin market will remain in Batavia. The tin mine in Banca is worked by Chinese labor. The miner has to sign a contract and since 1906 the cost of bringing him to Banca has not been deducted from his salary, whilst when his contract is finished the government allows him free passage back to China. The contract miner is engaged for 360 days, after which he can make another contract for one or two years, for which he gets a lump sum of Fl.35. This method works perfectly because after a year the coolie has got some practice in mining. The miner is paid per unit of 9 hours a day or eight hours night work with 36 cents. The more he works the more he makes. The government gives him advances for his living, etc., and when his contract is expired he receives his balance, which amount is a nice sum for a common coolie. The government supplies the mine with rice

which is distributed amongst the Chinese workers for a cheap price. At present there are employed about 25,000 Chinamen in the mines. The whole land of Banca is reserved by the government for tin mining.

The tin ore is melted and after properly cleaning made into the well known slab form, each slab having a weight of about 35 kilograms. The cost price for the government per picul is about Fl. 40. The average profit for the government is about Fl. 30,000,000 per year. The total output is about 250,000 piculs per year. Up to the beginning of the war all the tin was sent to Holland and was sold there through the Nederlandsche Handel Maatschappy on a commission, and then in 1914 the government started to sell tin locally in the Batavia market. The general opinion is, as I stated before, that the government will continue to keep the tin market in Batavia. Of course the Nederlandsche Handel Maatschappy will do their best to get the market transferred again to Holland. Roughly calculated the annual commission for the Nederlandsche Handel Maatschappy amounted to about Fl. 400,000 with practically no risks.

Tin is also found on the island of Billiton. This island is explored by a private company who has a license to explore the island until 1954 on condition that five-eighths of the profits is to go to the government. Billiton produces about 70,000 tons of tin per year. The Billiton tin was sold by subscription before the war in the Nederlandsche Indische Handels bank at Batavia, but since the outbreak of the war the

Handelsbank follows the government system of selling in the open market without holding an auction as was done before.

A third place where tin is found is the island Singkep. This island has been explored by the Singkep Tin Maatschappy since 1887. In January, 1907, the Singkep Tin Company found that a big tin field was under the sea-level, for which they obtained concessions on condition that 40 per cent of the gross profit was given to the government, and it proved that the tin under the sea was of more importance than the tin on the island itself.

The average output of the Singkep Tin Maatschappy is 10,000 piculs per year. Billiton and Singkep work mainly with Chinese labor.

Tin is found in several other places in the Dutch East Indies, but these are reserved for government explorations.

According to statistics, the world production is about 130,000 tons, of which the Straits Settlements produce 50 per cent; Germany which works Bolivia ore, 9 per cent; Great Britain 17 per cent, Banca and Billiton 13½ per cent, Australia 4 and China 5 per cent. The total world consumption in 1913 was put at 125,000 tons, of which the United States took 36 per cent, Great Britain 19½ per cent, Germany 15 per cent, France 6½ per cent, Austria Russia and Italy each 2½ per cent, Scandinavia, Spain, Switzerland and Australia each 1 per cent.

The quality of Banca tin is not guaranteed by the

government, but is sold on condition that it contains at least 99¾ per cent of pure tin. For some reason the Billiton tin is not so much wanted as the Banca tin, and I believe that this is owing to the color, as some tin consumers pretended that Billiton tin had a duller color. As a rule a difference in price is made. Since the outbreak of the war various big consumers in the United States have started to use Billiton tin and I have never heard of a complaint. The government and the Billiton Mine follow now the same selling policy. Every day after receipt of the London and Singapore quotations, which get in at about four o'clock in the afternoon, the government fixes the limit for tin for the day and exporters put in their bids on that limit. The government does not give in hand for cabling to the consuming countries, so it is very hard to make firm offers unless upon a speculation. The latter course is, of course, rather expensive, seeing the value of this article. Then the tin is sold by a government official, and of course this is a reason that sometimes funny resolutions are taken, and I know of a case where a government official, who happened to see a telegram from one of the exporters in January, 1919, to ship tin which was bought in October of the previous year at a price of a little over Fl. 200 got the impression that Banca tin was worth over Fl. 200. raised the limit of Banca Tin from Fl. 160. to Fl. 200. a picul, altho Singapore continued a price quotation of $118.50 per picul. As I happened to know the gen-

tleman in question personally he told me when I called his attention to this fact (that Singapore was quoting only $118.50) "I know that business at Fl. 200. is possible and I can tell you that business at this figure has been done."

The matter of local tin sales is now in the hands of the government for further study, as the local tin exporters are not satisfied with the way price fixing is arranged now, but personally I do not believe that a protest against the government's selling policy will have any success.

The packing of Tin is always in the standard packing of the mine while all the tin is first brought to Batavia before it is exported to Europe.

QUININE.

Quinine was imported into the Dutch East Indies in 1852. It was received by the Hortus in Leiden and exchanged for Indian plants from Messrs. Thibaut and Keteleer. The quinine plant died in India, but not before Mr. Teysmann had taken a slip, which plant died after sixteen years. In the meanwhile a Mr. Hasskarl was sent by the Dutch Government on the advice of the Governor General Pahud to the Andes Mountains in South America with a special order to obtain quinine seeds and quinine plants. He arrived in the Dutch East Indies in 1854 with 75 living plants out of an original 500 he selected, which plants were planted in Tjibodas 1527 metres above sea-level. Further, the Dutch Consul in La Pas in Bolivia (Mr. C. A. Schukroft) sent thousands of plants to the Dutch East Indies but the best results were obtained in the Dutch East Indies with the seeds which Charles Ledger sent to his brother George Ledger in London in 1865, of which seeds the Dutch Government exported a part direct to the Dutch East Indies. From this seed for which was originally paid Fl. 100.- not less than 20,000 plants were obtained, for which Mr. Ledger received an-

other Fl. 500. When afterwards it was found out the high value of the bark obtained from these plants they received in 1880 another Fl. 1200. and in 1895 an annual payment of Fl. 1200. Mr. Hasskarl was orginially in charge of the quinine plantation, afterwards Dr. F. W. Junghuhn came in charge. The latter gentleman advised the use of the high planes of Pengalangan as in Pengalangan the tree finds the same conditions as in its motherland, South America.

Cinchona Ledgerina Moens and the Cinchona Succirubra Pav are the only kinds of the imported varieties which proved suitable, later they grew in Java the Cinchona Robusta Trimen, which proved to be better suitable for pharmaceutical use, such as extracts, quinine mixtures and powders, etc. From the quinine alcaloides from the Ledgeriana the quinine salts are prepared. The bark is called in Java "fabrieks bast" (mill's bark), because this bark is put dry into the mills. The planting of Ledgeriana gives the best results from 1250 to 2000 metres above sea-level. If planted lower than 1250 metres many of the trees die at the age of from eight to ten years, while at the proper height the trees grow until twenty years old. Above 2000 metres the growing goes very slow. but at this height and up to 2500 metres the cinchona trimen grows the best. The quinine trees cannot stand heavy winds and neither moist in the soil. Practice has taught that planting 3x3 feet by which the sun cannot reach the soil anymore is the

best protection against helopeltis, and also gives the best results as far as quantity and quality of bark are concerned. The ledgerians are very easily inclined to grow into bushes, which is of course not desired, and this makes it necessary that about three years after planting they start with the clipping of the trees, which at the same time gives a first crop of quinine bark. By the first clipping one, or maximum two, of the lowest branches are clipped off and the following years the clipping is continued, and the trees which have too little room to develop properly are rooted out and planted somewhere else where there is more room. When the tree is five years old the tree has the biggest percentage of quinine. It decreases gradually until twelve years and is then afterwards constant. After the sixth year the quality of the bark decreases. The harvesting of ledgeriana is done in the following way: the principal roots, the trunk and the branches are beaten with wooden hammers upon healthy trees; the bark is then sufficiently loose to be taken off with knives made from horns. Steel knives cannot be used because they may hurt the tree. This beating and peeling are done by women. In the harvesting of the Succirubra, first a ring of bark is taken away and then the tree cut down, and special care is taken that the bark and the moss on the bark are damaged as little as possible. The bark is then cut in various lengths from one-fourth, one-half, three-quarters and one metre in such a way that a part of the bark dried comes in

cylinder form, which is increased by putting in the bark a stick and then putting the bark around the stick with bamboo strings; afterwards the bark is assorted and we get first and second quality. Some times when the bark is very big this special care cannot be taken and then the pieces of bark are packed as broken pipes or damaged parts or pieces. The bark from the trunks, roots and branches is packed separately, and also separately sold. The harvesting continues the whole year round. In order to get the water out of the bark the bark is dried first in the sun, and afterwards artificially (in a so-called sirocco). The ledgeriana bark (the so-called fabriek's bark) will after proper drying process be ground as much as possible and packed in gunny bags of 100 kilograms each. The succirubra bark is packed in cases in order to avoid damage as much as possible. The selling of the quinine bark is done after the chemist has made an analysis regarding the percentage of the various alcaloides, as quinine, quinine indine and cinchonidine, etc. As basis of valuation of fabriek bark is the unit, which means the price in Dutch cents per half kilogram of bark for each per cent of sulphate of quinine contained in a certain lot of bark for sale. By a unit of say, 5 cents and a percentage of 4 per cent, the price of a half kilogram of bark will be 20 cents.

The particulars heretofore mentioned are combined out of an article regarding quinine by Mr. P. van Leersum, written from Dr. van Gorkom's work en-

titled "Oost Ind. Cultures." From the foregoing it is clear that private quinine planters in the Dutch East Indies owe a big debt to the Dutch Indies Government, who imported the quinine plants, in which so many quinine plantation companies find their existence. The Dutch East Indies Government opened offices and a quinine plantation which were under the control of scientific managers and employees, and backed up by the Government's money they made all kinds of examinations and trials in the quinine planting, by which they found the best suitable quinine trees and the most economical way of planting, etc. Regarding all these subjects the private planter could get information from the Government and benefit by the knowledge of the Government officials obtained on the Government plantations. The private planters, of course, were again informing the Government officials regarding their experience obtained on their private plantations. Of how big importance this special care has been is proved from the fact that the quinine percentage of bark from healthy trees was an average 6 per cent for the ledgeriana, which percentage was found nowhere else. In British India and Ceylon where planting was done in an unscientific way, the bark obtained did not contain more than from 2 to 4 per cent of quinine salts, and also the production costs were higher than in Java. The plantations did not pay and the production remained small, so that in Ceylon the quinine plantations were gradually replaced by tea plantations.

There was a time that quinine was paid with fl. 1.50 per unit, but owing to the very bad co-operation of the producers, the debacle came in January, 1897, when the unit went down to 2.12 cents. This was the cause that many plantations were stopped after the plants were rooted, and various plantations could not even pay the taxes to the Government. Before 1897 it was generally pretended that the decreasing value of the unit of quinine bark was caused by over-production, but this could not be proved as there were no production figures in all selling statistics for quinine. The buyers of the quinine bark were the manufacturers of quinine sulphate in Europe and America, and they were so very few that they fixed the prices of quinine bark amongst themselves, while at the other end they could keep the prices of quinine sulphates very high. Since 1893 they combined and the Gold und Silberschiede Anstalt had the management of the general affairs of the manufacturers. Everything was kept very secret, the way in which the quinine was extracted, also the way the alcaloides obtained was sold, and they pretended amongst other things that they had always big quantities of quinine bark in stock and that they also had a big stock of manufactured and unsalable quinine, that they needed big capital for their mills to keep their mills going. The available stock of bark consisted of bark from South America, which, owing to the low percentage of quinine, was not salable as the Java bark, but also the quinine bark of lower per-

centage went back more and more, and later the same buyers paid less and less per unit. Several trials were made to get the bark producers to unite and to get them to control the bark exports, but in each decreasing of price of bark big exports followed, as several estates tried to cover their expenses by continual big crops, others because they thought that the time for quinine plantations had passed by. After the debacle in January, 1897, the planters united at the end of that year and fixed the price per unit at 7 cents, and although the manufacturers pretended that they had an over-production, they paid at several bark auctions a price of 7 cents per unit. Then the manfacturers decided not to pay that price in future any more and the combine of planters went out of existence and every planter was selling on his own behalf again. They tried to assist the planters in another way..

The Bandoengsche quinine factory was erected which, situated in the middle of the production country, was of course best suited for the extraction of the quinine, but the new factory had to look still where to place her article. Also the Government showed here her assistance by giving her bark to the mill for manufacturing. After a lot of trials and adventures the mill succeeded to produce sulphate of quinine, which was put upon the market, and now they sell all over the whole world. When the Bandoengsche quinine factory started to produce, the European factories were afraid of the Bandoengsche

quinine factory and the planters were satisfied with the price obtained in Europe that they gave as little support to the fabriek by giving less and less bark for extracts instead of which they were shipping as much as possible to the Amsterdam market. The result of it, of course, was the lowering of the unit in Amsterdam, but the very low units as in January, 1897, did not come back. The Bandoengsche quinine factory broke up a part of the power of the European factories, but also this power was broken by the establishment of a quinine market in Batavia in 1900, which opened the opportunity for the produce of the Bandoengsche quinine factory to be spread all over the world and to establish a good name for the factory. The lack of co-operation with other planters by shipping to Amsterdam and not supporting the mill in Bandoeng was shown in 1907. The Preanger Quinine Association proposed to 165 plantations by a circular letter to ship monthly one one-twelfth of the expected yearly production. From this circular letter they received about thirty replies, but there was so little cohesion that the whole thing was dropped again. The result was of course that the unit of quinine bark in Amsterdam was also lowered again by the European buyers and in 1908 was not more than an average of 3.7 cents. Then the unit continued to lower and in 1909 it averaged 3.04, in 1910, 3.17; in 1911, 3.16. In 1910 the quinine auctions in Batavia were stopped as there were no buyers in the market. Moreover, the Bandoeng qui-

nine factory had found such a sale for their article that as far as they were concerned, no sales in Batavia were necessary any more, and they, the Bandoengsche quinine factory, started to buy the bark produced by the planters on the auction. The continuing low units proved to the planters that only co-operation could help them to better conditions. In 1910 there was talk of locating a second quinine factory in Java. This plant did not come through. The same year there was opened in Amsterdam a quinine bureau, which office got Mr. Lovink director for agricultural affairs in for quinine interests. The result was that in 1911 there was erected in Batavia the Ned. Ind. Vereeniging van Belanghebbenden by De Kinacultuur, or in English the Ned. Ind. Association of interests with the quinine plantations, which association co-operated with the office in Amsterdam and resulted in a combine of planters and manufacturers which tried to come to better regulations regarding the sale of bark and quinine. In 1911, after the director of the Bandoengsche quinine factory had been in Europe, it seems that the European and Indian factories had come to an entente. The manufacturers offered a plan for an agreement to the planters, but the conditions were absolutely against the planters. In 1912 the planters took again their old means which proved to be a success on previous occasions, i. e., by fixing the limit of the bark and so forcing the manufacturers to pay more. In the meantime Mr. van Leer-

sum had found a chemical process to make quinine out of the wet bark, and a syndicate was found for a new mill in which this new process was to put in force. At the same time the Government had decided to make a small quinine factory with a capacity of 12,000 kilograms sulphate per year to try out Mr. van Leersum's process. Now it was proven that the planters had to co-operate in order to get better conditions, and at last the manufacturers were convinced that they had to give in before it was too late. They asked that the Government mill should not be erected. Private people would not have a right to erect a quinine factory in Java during the time of agreement. The contract should be closed for five years. Mr. W. C. Loudon went to Europe in order to arrange all details for an agreement with manufacturers. In the meantime the unit had been increased slightly to 3.95, but there was big trouble, as the planters had a big stock in July, 1913, of 54,000 bales, or about 285,000 kilograms sulphate. This big stock of the planters was caused because the factories in Europe had kept their big stocks of bark in 1910 and 1911, during which years the Batavia quinine factory blocked the market for quinine by selling about 100,000 kilograms of quinine, and now that the new agreement came in force the manufacturers were, of course, using their own old stocks. The stock of the planters now was the big difficulty during the arrangement between planters and manufacturers, because the planters were compelled to sell.

Now the President of the Ned. Handel Maatschappy, Mr. van Aalst, induced the producers to form a syndicate, which took over about 180,000 kilograms from the stock of the planters and paid the planters immediately 60 cents per kilogram, 3 cents per unit. The remaining 100,000 kilograms of the stock would be considered as floating stock. The purchasers paid, covering expenses and paying off the mortgage, fl. 2 per kilogram, 1 cent per unit, and the syndicate took further charge of the sale of the bark and settlement with the planters. On the 16th of July, 1913, the agreement between planters and manufacturers came into force. The manufacturers will receive during the five years on behalf of planters 515,000 kilograms sulphate at a minimum of 5 cents per unit as long as the English quinine selling price is not higher than 16.50 per kilogram. In case the price is above this limit then the excess will be equally divided between the planters and manufacturers. Each year there are ten subscriptions where every time one-tenth of the total stock is delivered after deductions of the part which the Bandoengsche quinine factory gets out of the 550,000 kilograms, which part is fixed every year. This co-operation finished the battle between producers and consumers, which had lasted for twenty years, and no doubt both parties will have all the profit, as usual.

The planters have to thank the Dutch Government for the big assistance the Government has given to get this agreement put through. The agreement was

signed by 122 quinine planters, whilst the mills connected were the following:

Chininefabriek, Braunschweig, Vuhler & Co., Braunschweig ver. Chinine Fabriken, Zemmer & Co., Frankfort o./m. C. F. Boehringer H. Sohne, Nannehim, Nederl. Kininefabriek, Marsen; Amsterdamsche Chinine Fabriek, Amsterdam; Howard & Sons, Ltd., London; Pointet & Girard, La Soc Am du Traitement des Quinquinas, Charles Bucket et Cie., Pharmacie Centrale, Paris, Tailleandier Co. at Porte de Samois, Argenteul and the Bandoengsche Kinine Fabriek, the Deutsche Gold und Silberscheide Austallt Vormals Roesler at Frankfort.

The Dutch Government took charge of the control and settlement between manufacturers. The list of quinine manufacturers is not absolutely complete, there might be one or two missing, but it is clear that the total manufacturers has always been small compared to the amount of planters, so that since the manufacturers were combined since 1893 they could dictate their will to the planters. The manufacturers had each their own part of the world for their sales and were only competing strongly against outsiders, as the Bandoengsche Quinine Factory. There has never been an actual market for quinine, as the manufacturers fixed the price for quinine, which many a time was absolutely not in proportion to the price of the raw material, so that the manufacturers were having big advantages, while the planters were competing heavily with their big ship-

ments. Still the new agreement now made the conditions better for everyone concerned. There are still some plantations in Java that are not contained in the plantations who signed the agreement, but they are only a few, which cannot have any influence on the market.

The most important market for quinine bark is Amsterdam. In 1913 a small quantity was exported to London. Other markets for bark do not exist.

The total production of Java in 1900 was 6,200,000 kilograms of bark, while the other countries, South America, Brtish India, Ceylon, sell their produce in London, but the quality of their bark was very poor. Since 1900 the imports of bark in London decreased, and in 1913 the imports there were only 296,000 kilograms. The world production of quinine can be put at about 10,200,000 kilograms, which quantity is also consumed, and at present Java supplies 97 per cent of this quantity. The Java planters have thus a control over the world market in their hands, and the Dutch East Indian Government during the war has used this position many a time to an advantage in case exports to Holland or India were too much restricted. Of course, the immediate result of this was that in British India the planters have started to study the quinine situation in order not to be absolutely dependent upon Java, but I do not believe that this will be a big success unless the British Government assist the planters in India the same way as the Government has done in Java. As regards the

Bandoengsche factory, it is very interesting to see their profit and loss figures from 1914 to 1918. The shares are quoted on the exchange at 600 to 700 per cent. The prospects of the quinine planting in Java are absolutely splendid, and they will continue to be unless an artificial surrogate is found, but the possibility is not so big, as quinine is consumed in very small quantities and it does not pay consumers to try to save the price on an article used in such small quantities, the cost of which is comparatively still very low. From an export point of view Java exporters can only get produce from plantations which did not sign the agreement. Further, a Japanese firm bought a quinine plantation early in 1918, probably for exportation of quinine bark to Japan.

In 1918 when the first agreement expired this was renewed with the association of quinine manufacturers in allied countries, whilst the German manufacturers were left out. What effect this will have on the market after peace declaration is not hard to say, as this will strengthen the market.

COCA.

The planting of coca is of very recent date and only since 1908 Java coca has been noted in the world market. In Java there are two kinds of coca, which are called "Peru coca" and "Java coca." The Latin names are Erytroxylum Coca Lam and Erytroxylum novogranatense.

The coca originates from South America and was introduced into the Dutch East Indies in 1878 at Buitenzorg. The plants start to give a first crop from eight to twelve months after planting and continue until the twentieth year. This quick ability to produce is the reason that coca is sometimes planted as a catch crop for rubber plantations in Ceylon and British India. In Java the coca is as a rule planted in the mixed plantations, which also produce other kinds of crops. The best result is obtained from 300 to 1000 metres above sea level in a moist climate. Planting is very easy when in nurseries the seeds are grown, and after two months the plants are big enough to put into the plantation, which has to be done in the west monsoon. When coca is planted as a catch crop it is done from 2x3 feet. In case it is a permanent plantation the plants are planted 4x3 feet. As only the coca leaf is of

interest, the whole planting system is to get as much leaves from the trees as possible. After the leaves have been plucked they are immediately dried, either by sun or by machinery as used for drying tea, which drying is finished the same day. Special care is taken that no fermentation takes place, as otherwise the leaves would lose too much of their alkaloid. The dry leaves have to be packed very carefully in order to avoid their taking up water out of the atmosphere again. Therefore the packing is done in most cases in the way as tea is packed. Sometimes, however, to save these expenses the leaves are pressed into bags. Always before packing the leaves are ground.

The coca planting is very simple and the plantations need not much care. As in the beginning high prices for produce were paid and as the planting was very simple the result was that many coca plantations were started. This is given as the reason for the over-production, for now the world production of leaves is far too big for the actual consumption of cocaine.

The extraction of cocaine out of the coca leaves is done in Europe and also in Japan. The alkaloids are not free in the leaves, but for each kilogram of leaves about 20 grammes of quicklime and a half litre of water are added and mixed well. This mixture is put into an extraction appartus and gasoline added to it. After the first extraction the so-obtained fluid is put into a second extraction apparatus with

a new leaf mixture. The extract so obtained is worked into a distilling apparatus, the gasoline is taken out and the cocaine remains.

The coca leaves are bought per unit, i. e., the price is in cents per half kilogram of leaves and per percentage alkaloids. The average strength of the leaf is about 1½ per cent. The price for the units were in 1911 39.1 cents, in 1912 21.55 cents, in 1913 19.45 cents, in 1916 14.50 cents.

The coca plantations in Ceylon were prohibited by the British Government in 1915, and in August, 1916, the importation of cocaine was prohibited in England and its colonies, which now leaves very few markets open for the Java coca. The big drop in price in 1912-1913 was caused by the opium conference and convention which was closed on the 23d of January, 1912, in The Hague, where France, England, Italy, United States of America, Holland, Germany, Portugal, China, Japan, Persia, Siam and Russia decided, also for the colonies of those countries, to stop gradually the use of opium, morphine and cocaine, and also the importation or production of the raw material out of which these products can be prepared, except for small quantities which are needed for medicinal purposes. But according to my opinion, even if this agreement had not been made, the planting of coca would not have had much future, as Java forgot that she was not the only producer, and, moreover, that Java coca was not of the best quality.

In 1909 Java produced about 380,000 kilograms of leaves, with a world production of over 2,000,000 kilograms. The big coca markets are Havre, London, Holland and Amsterdam. In Amsterdam mainly Java coca is sold. The American coca has the advantage of having a bigger percentage of cocaine, while the extraction of cocaine is very easy. When in 1912 the big decrease in value of the coca leaf started planters in India of course discussed ways and means to overcome the difficult times. They were discussing to make a coca produce trust and make their own cocaine here in Java, thinking that they could obtain the same results with coca as with quinine, but they forgot in the first place that Java is not of the importance for coca as it is for quinine; secondly, that Java coca does not contain as much cocaine as the leaves from other producing countries, while the Java cocaine is more difficult to extract. In the third place, Java coca cannot be used in chemical preparations.

The decrease in the value was caused:

(a) By big imports in the market, and

(b) By the regulations of the opium convention of the 23d January, 1912.

The planters decided not to erect the cocaine factory, and so the trust organization did not go through. The general opinion now is that coca growing in Java has no future. The export from Java in 1914 was 1,353,000 kilograms, in 1915 1,000,000 kilograms, and in 1916 137,000 kilograms.

ARAK.

Arak is one of the spirits made in Java out of sugar molasses and is mainly exported to Holland, and from there to Norway and Sweden. In the latter countries they use the Arak for the manufacture of the "arak punch." The average export is about 1,000,000 litres a year. In Java very little is sold locally, as the directors of the companies producing the arak want to keep the market in Holland, where they make a selling commission.

Arak is packed in so-called leggers, which are big wooden barrels specially made for this trade, and, as a custom, the empty barrels are returned to Java for which the steamship companies quote a special freight rate.

The quality is judged by the percentage of alcohol and the time the Arak has been stored in Java.

The main ports of shipping are Batavia, Cheribon and Soerabaya.

SPIRITS.

This article is also mainly manufactured from sugar molasses, and in Middle and East Java large manufacturers of this line have located in the last ten years. The average production is about 17,500,000 litres a year. The big consumers of this commodity are China, in the first place, British India and Holland. In 1915-1916 big quantities were shipped to Switzerland. Prices were very uncertain and from a pre-war price of fl. 40– per hecto litre we saw prices soar up to fl. 80– and even more. Price of spirits is based on the percentage of alcohol. The packing is done in iron drums, which as a rule are returned empty to the distilleries for re-filling. For the local and Chinese market packing tins and cases have been used, but leakage and pilferage when this way of packing is adopted is so great that lately the exporters have decided to discontinue this method of packing unless the buyers will accept the risk of leakage and pilferage. In 1918 we had a case where Europe was willing to pay the prices in India with the understanding that if no packing materials were available no sales could be effected. The distilleries did not want to sell their barrels and drums

for storing purposes and preferred to send the drums to the Indian and Chinese markets, from which places they could be returned within a short time. Wooden barrels are not advisable, as the leakage and deterioration of quality is too excessive. The important place for spirit transactions is Soerabaya. Several of the spirit distilleries follow the system used by the arak distilleries, i. e., do not sell their produce in Java, but do this via Holland.

MANGROVE BARK.

Everywhere in tropical countries where the beach is low and extensive there are large forests which, during the ebb tide are more or less dry, whilst during high tide nothing else but the higher branches and leaves are to be seen.

The greater part of the trees forming these forests contain tanning material, percentage of which is sufficient to be exploited. These forests are generally known as mangrove forests, and the bark collected from the trees is brought to the market as mangrove bark. Trees of the Rhizophoraceae and Carapa kind are the big suppliers of bark.

These mangrove forests are found on the east coast of Sumatra, North coast of Java and Kinderzee, the coasts of Borneo, some parts of Celebes and New Guinea. The mangrove vegetation is biggest in Borneo and Sumatra.

Harvesting is very simple. The trees are cut down, the bark taken off, which is dried and more or less ground and packed in bags.

The tannin percentage of the bark must be at least 40 per cent to be salable bark.

In the Wester Afdeeling of Borneo in Telok Ajer

the tannin is extracted in a factory, and this extract brought in solid form is known in the trade as cutch.

The export of bark amounts to an average of 10,000 tons yearly, actual stocks are, of course, far bigger.

The mangrove bark trade is mostly in the hands of Chinese, as far as Celebes and East Sumatra are concerned, whilst South Sumatra and Borneo, the Borneo Sumatra Handel Mij. has practically the control. The mill in Telok Ajer belongs to the Borneo My.

The average price of cutch is fl. 250– per ton f. o. b. main port.

Mangrove bark is packed in second-hand bags, for which they use old rice bags. The quality is only judged on percentage of tannin contained in the bark, for which chemical analysis is necessary.

GUM BENZOE. (Benzoine.)

This gum is produced by the Styrak Benzoin Dryander, a tree which grows from ten to twelve metres high and in the Dutch East Indies is practically only found in the island of Sumatra.

Originally the tree was only found in the wild forests, but lately the natives have started also a kind of cultivation. This is done mostly in the ladangs (dry rice fields).

The seeds are put into the ground together when the rice is planted on distances of 5-7 meters and where the rice crop is harvested the little trees are already strong enough to stand alone.

It takes about seven years before the styrax starts to produce. In order to get the tree to produce it is tapped, and this is done about every three months so that there are four crops during a year.

The average yield per year is about 12 kilograms. At 10 years of age the tree is at its highest producing state and usually dies after twenty years.

The Benzoe appears in the form of pearls or tears on the cuts. First the put gum is cut off, which is, of course, the best quality, later also pieces of bark are taken.

The Padang gum benzoe is packed in cases of 70-80 kilograms.

The Palembang gum is put in small barrels made out of bark, containing about 12 kilograms. Palembang has the biggest export, as is proved from the following export figures in kilograms:

	1911	1912
Palembang	1,229,000	1,193,000
Baros	264,000	534,000
Siboga	7,000	142,000
Padang	46,000	77,000
	1,546,000	1,746,000

	1913	1914
Palembang	1,345,000	484,000
Baros	224,000	212,000
Siboga	68,000	111,000
Padang	26,000	52,000
	1,662,000	859,000

The war, of course, had an immediate influence on the export of the article, as the big consumers, France and Russia, were not in the market, and America only imported small quantities.

Besides Sumatra, Gum Benzoe is produced in Siam, the produce of the latter country is even considered of better quality.

The price in Sumatra varies between fl. 35– to fl. 50– per picul.

The first quality Palembang gum benzoe packed in tins was sold in 1917-18 at Mex. $23-24 in the Singapore market, per Singapore picul, whilst before the war the same quality was paid with $50-55.

GUM COPAL.

This is a gum produced by the Damara Alba Rumph and Damara Celebica Kas. The first kind is found everywhere in the Dutch East Indies, but few in Java, whilst the latter, as indicated in the name, is found in the wild forests of Celebes.

The trees grow up to 70 M. with a diameter of about 2 M.

The gum is found in the branches, roots and trunks of the trees and the longer length of time waited before the gums are collected, the harder the gums are.

The collecting of the gum copal is done in two ways.

1. During the centuries the gums produced by the trees went into the ground and hardened there. The natives go into the forest with iron sticks which they put in the ground and when gum is there they feel it. The gum found this way is dug out and because of its hardness paid highest.

2. The tree is tapped, but as is the case with rubber, also for the damars, the right way for tapping has not been found yet.

The tree is tapped 3 to 4 times a year, the gum appears and hardens in the air and is cut off later.

The production per tree varies from 60-150 kilograms per year.

The gum copal is sold by the natives to Chinamen, who clean the raw material and segregate it in the various grades. Afterward it is usually packed in mats.

The average export is about 6000 tons yearly.

The gum is mainly exported from Macassar, Ternate, Pontianak, Gorontalo, Muntok Palembang. Macassar is the biggest local market. Average prices during the last year were for:

Loewoe and or Boengkoka	fl. 25-	32-
Loba, half hard, unassorted	12-	18-
Teboengka, hard and or half hard	23-	27-
Gorontalo and or Posso	16-	18-
Papua, soft	8-	16-

London prices average shillings per cwt.:

Manila, Makassar, fair, dark	57½	85
Pontianak, dark to pale scraped hard	62½	85
Pontianak nuts, small to bold	28½	43½

GUM DAMAR.

This gum is produced from high growing trees belonging to the Dipterocarpacae, which is found all over the Indian Archipelago. The gum damar in the trade comes chiefly from Borneo and Sumatra.

The difference is that the Borneo gum damar contains small air bubbles, which do not appear in the Sumatra gum. There is no difference in value.

Practically all gum damar is brought to the Batavia market, where the trade is in the hands of Arabs and Chinamen. They advance money to the native collectors, who ship the damar to Batavia.

The raw material is cleaned, broken and assorted, which manipulation is called in Dutch "pikken;" the dealers who do this are caller "pikkers."

After the damar is cleaned properly it is assorted in A, B, C, D, E, and F grades, A being the biggest pieces, F being dust. F is as a rule sold separately.

Europe and America buy the so-called Batavia assortment, i. e., the pikkers deliver per 100 cases, 10 cases A, 10 cases B, 30 cases C, 22 cases D and 28 cases E grade. Each case contains one picul. America wants the assortment packed in one case, assorted as follows:

Five per cent A on bottom, a sheet of paper on top of which 5 per cent B, another sheet of paper on top of which 15 per cent C, paper, 11 per cent D, paper, 11 per cent E, paper, 15 per cent C, paper, 5 per cent B, paper 5 per cent A.

The average yearly shipment is about 4000 tons, of which the U. S. A. uses 30 per cent, British India 20 per cent and Holland 15 per cent. England, Germany and France use each about 10 per cent.

The price stated in the Batavia market reports is always the full Batavia assortment, A-E.

Prices vary around fl. 40– per picul, excluding packing, for which fl. 1.50 extra is calculated.

CITRONELLA OIL.

Citronella oil is produced by the Cymbopogon Winterianes Jowitt and the Java grass is probably imported from Ceylon. The planting of citronella grass is in the hands of the natives, who cut it and deliver it to the distilleries at about 25-30 cents a picul. There are but very few European mills, one of them being the well known Odorata, which mill has given its name to a certain high-grade quality, but the other mills are owned by Chinamen.

Citronella oil is bought on percentage of geraniol and as a rule the factories have to guarantee 85 per cent geraniol minimum, which figure is controlled by the Government laboratories in Buitenzorg, which figures are final for all parties.

Before the war buyers bought a yearly output of a mill, with an option clause for the following year's output. In this manner outsiders were kept out, but the war made an end to this monopoly and now the citronella oil is regularly sold at the open Batavia market.

The oil is packed in galvanized iron drums.

Export figures for:

1912	1913	1914	1915	1916	
76,333	75,250	136,654	233,326	428,743	Kg.

The market value, including drums, varies between fl. 2 and 3.50.

ARACHIDES (GROUND NUTS.)

The ground nuts are the seeds of the Ara-his hypogea. The flowers of this plant bend toward the ground and the fruit is found under the ground. Flowers which cannot reach the ground do not produce fruit.

The ground nuts are of big importance as oil seeds. They contain 40-50 per cent oil, which is of a good quality.

The plantation of the arachides is in the hands of the natives and limited to Java, Madoera and Bali.

The ground nuts are mostly shelled and packed in bags; the unshelled ground nuts are exclusively sold to Marseilles.

The shelled nuts are divided in three qualities: 1, Buitenzorg; 2, Cheribon; 3, Toebang ground nuts.

Export figures: 1908, 22,500; 1909, 16,200; 1910, 20,000; 1911, 25,000; 1912, 19,000; 1913, 17,500; 1914, 16,000; 1915, 11,000; 1916, 8000 tons of 1000 kgs., the decreasing export figures 1914-16 are, of course, caused by the world war.

FIBRE.

Kapok is a produce of the kapok tree, which is known in the Indies since centuries. It is impossible to tell from what country the tree originates, but it took a long time before the commercial value of the kapok and kapok seeds were found out.

In 1860-70 the yearly export was only 3000 piculs (180 tons), whilst now the figure is about 10,000 tons.

The kapok fibre is of a short staple and not suitable for spinning purposes, but the material is used as filling for pillows, mattresses, swimming belts, etc.; the seeds are crushed and an oil is obtained similar to cotton oil.

The kapok tree is in blossom 3-4 times a year; the kapok with the seeds is contained in boxes which open when the fruit is ripe; the seeds are separated and the kapok put in bags and later pressed for export.

For export the kapok grown in Middle and East Java and Madura is practically of the only interest, Semarang being the biggest market.

The biggest buyers are Holland, U. S. A. and Australia.

Before 1914 the sellers were very careless in the delivery of their produce, but in that year the

Semarang Chamber of Commerce started to fix type-samples for the various grades, which are refixed every year, and the percentage of dust and seeds allowed in the produce fixed as follows:

Superior Java kapok	½ per cent seed and dust
Prime Java kapok	1½ per cent seed and dust
Prime Soerabaya kapok	1½ per cent seed and dust
Prime Madura kapok	1½ per cent seed and dust
Prime Porong kapok	1½ per cent seed and dust
Prime Toebang kapok	1½ per cent seed and dust
Fair average kapok	3½ per cent seed and dust

The kapok is packed in unpressed bales of 55-60 katti to a maximum measurement of 16 cf.; for the double pressed bale, 1 picul is calculated to be 16 cf.

Kapok seeds give about 25 per cent of their weight kapok oil, and consequently there is a large export (average 20,000 tons) of these seeds to oil crushers, mainly in England and France, which two countries take over 90 per cent of the output.

Kapok seeds are bought not to contain over 25 per cent brown and empty beans; to control same, the buyer takes samples and counts 500 or 1000 seeds and has them cut open and then counts the amount of brown and empty beans. All percentages above 25 are deducted from the weight, the buyer having, however, the option to refuse the lot.

The seeds are packed in bags of 1 picul.

Manila Hemp is a fibre produced by a banana tree the fruit of which is inedible (Musa textiles). The

name indicates which country is the biggest producer. The total planted area in the Dutch East Indies amounts only to about 300 bahoes, but of more impórtance is the

Sisal or Agave Fibre. Agave originates from Mexico, the best producing plant being the Agave Fourcroydles Lemaire, or white sisal.

It is very difficult to obtain reliable figures about this article as, as far as European plantations are concerned, the greater part of the plantations are owned by the Handels Vereeniging Amsterdam, and no particulars are given.

When buying attention has to be given that the produce is clean, white and the length of fibre has to be stated by the sellers in the percentage of fibre below 1 M, the precentage from 1 to 1½ and above 1½ M.

The quantities exported are increasing rapidly. In 1909, 150 tons; 1910, 350; 1911, 400; 1912, 4500; 1913, 7500; 1914, 10,750; 1915, 14,670; 1916, 15,200.

TOBACCO.

It is difficult to trace when actually the tobacco plant was introduced in Java; the first figures mentioned are 1840, when there was a tobacco crop of 15,000-16,000 bales. The production of tobacco has increased regularly and now tobacco is planted all over the archipelago.

The outsider only thinks of Deli when the word tobacco is mentioned, but the tobacco crop of Java is bigger than the Sumatra crop, though the quality of the Deli tobacco is far superior.

Tobacco, originally a South American plant, is now planted all over the world. The original qualities in the Dutch East Indies are not to be traced, but it is said that the superior Deli tobacco is a result of a crossing of Havana-Manila.

The tobacco plant needs much moisture and the roots want plenty of air, so the soil has to be properly worked before planting. The tobacco plant takes a lot out of the soil and the same ground cannot be used two successive years, even with use of manure. In Java they calculate one tobacco crop followed by two rice crops before tobacco is planted again. In Deli, after the tobacco crop follows one rice crop and 4-5 years, the fields are left alone, before new planting starts again. The big estates consequently

plant each year one-sixth or one-seventh of their areas with tobacco.

The tobacco is planted 3x1½ feet, giving about 15,000 plants per bahoe, each plant gives about 20-30 leaves. The top leaves and the leaves nearest the ground are of less value than the middle ones.

The so-caled "voet" and "midden" leaves are used in the cigar factories for wrappers. Krosok is a good sound leaf which is used as inner wrapper, whilst the filling consist of rejected krosok and kampong-krosok.

Tobacco is put in bundles of 50-60 leaves, which are fermented and dried, a rather complicated process. Afterward the tobacco is assorted as to color, length and quality.

The best leaves are those which are not broken, have no holes and are of an even brown color, the thinner the leaf the more valuable.

The next quality is the speckled leaves, and the lowest the leaves with holes.

Tobacco is assorted in lengths of 16, 12-16, 9-12 and 6-9 inches.

The average Sumatra crop is about 275,000 bales of 80 kilograms, for Java it is impossible to obtain reliable figures, but the output will be about 500,000 bales.

The average price for Java tobacco is about fl. 0.35; the average price for Deli tobacco about fl. 1.30.

The Dutch East Indian tobacco output is about 25 per cent of the world output, and is mainly sold in the Amsterdam and Rotterdam markets.

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